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INVESTIGATIONS OF AN INFLUENZA EPIDEMIC IN MILITARY CAMPS IN VICTORIA, MAY, 1942.[1]

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DURING May, 1942, there was a typical outbreak of influenza in Victoria, and in all the military camps near Melbourne a sharp rise occurred in the number of reported cases. At the request of the Deputy Director of Medical Services, Line of Communications, Victoria (Colonel Gordon Shaw, D.S.O.), we undertook an investigation of this epidemic, primarily to establish whether it was true virus influenza, and if so, to determine the type of virus responsible. This paper presents an account of the laboratory investigations carried out to this end. It is concerned largely with the application of two recently developed methods to the study of influenza virus infections. These are, first, the use of amniotic inoculation of chick embryos for primary isolation of virus (Burnet[2]), and secondly, the phenomenon of red cell agglutination by influenza virus (Hirst[3]). It will be shown that the most convenient method of isolating virus from filtered throat washings is by amniotic inoculation, the amniotic fluid being tested after three or four days' incubation for its capacity to agglutinate guinea-pig or fowl red cells. If appropriate standard immune ferret serum is available, the type of virus can be determined immediately an active amniotic fluid is obtained.

In confirmation of the findings of Hirst and his collaborators,[3][4] comparative antibody titrations by the red cell method have shown that a sharp antibody rise can be demonstrated in almost every case.

Epidemiology and Clinical Features.

The outbreak started in the late autumn and coincided with a period of unusually wet weather. Cases first occurred in one large camp during the last week in April. A week later epidemics were reported simultaneously from camps covering a wide geographical area, several hundred miles apart. Within individual areas the epidemic developed rapidly, reaching a peak in two or three weeks and thereafter falling off sharply. The total incidence of patients admitted to hospital varied from approximately 10 to 100 per 1,000. General inquiries revealed that a fairly extensive outbreak also occurred in the civilian population at this time, although it was not possible to obtain specific data regarding incidence or distribution.

Clinically, the disease corresponded closely with the description given by Stuart-Harris, Andrewes and Smith[5] of the English influenza epidemic in 1937. In the majority of cases it could be readily distinguished from other forms of upper respiratory tract infection. There was a surprisingly uniform clinical picture at all stages of the epidemic. The onset was sudden, with malaise, headache, shivering, dizziness, fever and pain in the limbs. Respiratory symptoms were not prominent, a slight sore throat and dry cough being present in about half the cases. The temperature, usually between 100° and 102° F. on the patient's admission to hospital, fell to normal in two or three days, sometimes showing a second "biphasic" rise for one day. Recovery was rapid and convalescence uneventful except for occasional relapses. Respiratory complications of any sort were rare, and there was no mortality.

[1] Work carried out with the aid of grants for research on virus diseases from the National Health and Medical Research Council and from Mr. E. Alec Cato.

Technique.

Throat washings were obtained by giving the patients ten cubic centimetres of saline solution to gargle. The garglings were mixed with five cubic centimetres of broth and returned to the laboratory as soon as possible. After filtration through sterile filter paper, the fluid was passed through an Elford type gradocol membrane of an average pore diameter of about 0·8μ. Several twelve-day embryos were inoculated amniotically each with about 0·3 cubic centimetre of filtrate. After four (sometimes three) days' incubation at 35° C. the embryos were examined, and the allantoic and amniotic fluids were removed. Smears were made of any cells in the tracheal fluid, and the lungs were examined macroscopically and in selected examples by histological section. Details of these methods will be found in the paper by Burnet.[3]

Hirst Titrations.

We have used a modification of Hirst's technique, which requires smaller amounts of reagents and is applicable to a wider range of conditions. Instead of determining the proportion of unagglutinated cells after a standard period, we allow time for all the cells to form a sediment and use the pattern they make on the bottom of the tube as the index of the extent and type of agglutination. In all tests, tubes of an internal bore of one centimetre are used, and the final volume of fluid in all is 0·75 cubic centimetre, made up of one (0·25 cubic centimetre) volume of diluted virus, one volume of diluted serum or saline solution and one volume of a 2% suspension of red cells. If fowl cells are used, deposition is complete in from one to one and a half hours; but for guinea-pig or other mammalian cells rather more than two hours are required. If readings are made as soon as the cells have been deposited, it is immaterial whether the racks are left at room temperature or in the refrigerator. The refrigerator is used if it is necessary to postpone readings till the next day, as agglutinated cells stick more firmly to the glass at the lower temperature and retain their characteristic pattern much longer. The standard type of pattern is an almost uniform sheet of small granular aggregates spread over the hemispherical bottom of the tube. This is a "++" reaction. If the agglutination has been rapid, portions of this sheet break away and slide toward the lowest point of the tube, giving a characteristically ragged appearance ("+++" reaction). The end-point of titrations is taken as a partial agglutination, in which there is a pronounced central accumulation of unagglutinated cells surrounded by closely sprinkled granules of agglutinated cells ("+" reaction). Intermediate ("+ ±") and minor grades ("±", trace) are also recorded, and the end-point is interpolated if necessary.

Neutralization Tests.

All neutralization tests were made by the use of Hirst's reaction according to the following method:

The stock virus suspension was in the form of allantoic fluid from eggs inoculated at eleven days with the virus strain required and opened for the collection of fluid after two days' further incubation. A preliminary test of the virus stock was made, doubling dilutions being used, and the end-point was determined. The standard dilution used in serum tests was of five times this concentration; for example, if the end-point ("+" reaction) was 1:320, then a 1:64 dilution would be used.

All the titrations shown in Figure I were carried out with a single batch of virus ROW, and on each day the standard dilution was tested against a standard ferret immune serum and a pool of high titre human serum was used as a secondary standard. Within the limits of experimental error (one-half tube difference), the neutralizing power ascribed to the standard types of serum remained constant.

In the titration of the first and second serum specimens, serial twofold dilutions from 1:10 to 1:320 were prepared. To each tube 0·25 cubic centimetre of the standard virus dilution was added, and after this had been shaken 0·25 cubic centimetre of 2% fowl red cell suspension was added. The racks were placed in a refrigerator and readings were made after an hour and three-quarters. In almost every instance the end-point lay within this range; but a few of the samples from convalescent patients required further dilution to give the end-point.

Primary Isolation of Virus.

By means of the method of amniotic inoculation, influenza virus was isolated from eight of the ten throat washing filtrates which were tested during the height of the epidemic. All these washings were from patients in the first two days of illness.

Most of the inoculated embryos were examined after four days' incubation. With the exception of those inoculated with filtrate ROW, the macroscopic changes were slight and sometimes absent. The amniotic fluid was seldom reduced in amount, but was usually less viscous than normal and more or less opalescent. The embryo appeared healthy, the lungs being sometimes but not always paler than normal. Only in one or two cases, without recourse to Hirst's test, could one have felt confident that the embryos were infected. Strain ROW, however, was apparently more active than any of the others; all four inoculated embryos were visibly infected, having reduced and turbid amniotic fluid and presenting "positive" tracheal smears. Hirst tests showed that virus was present in amniotic but not in allantoic fluid, again with the exception of ROW; with this strain two embryos had infected allantoic fluid. The primary fluids showed a higher titre when tested with guinea-pig cells than when tested with fowl cells; this differential effect will be described in a separate section. Fluids providing a positive response to the Hirst test gave typical findings on sub-inoculation into further chick embryos, and in each case the serological character of the virus was worked out with second or third passage material. With the strain ROW serological typing was carried out with the first passage fluid, and its character as an influenza A virus was established three days after the throat washings were obtained.

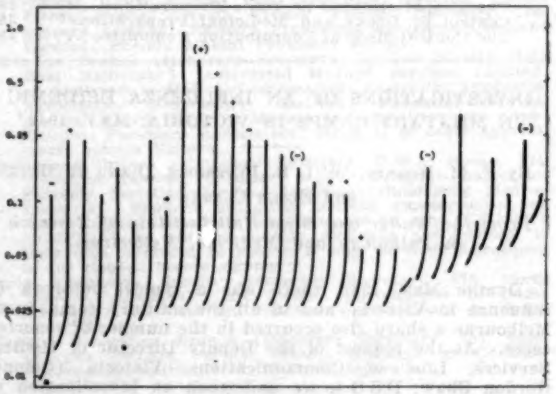

FIGURE I.

Antibody responses of 31 patients with clinical influenza during May, 1942. The results are arranged in order of initial antibody level as judged by the Hirst test against the homologous strain ROW. The values are in terms of the immune ferret serum F 172 (ROW); "+" indicates that virus was isolated from the patient concerned, "(+)" from a pool of two including this patient, "–" that the virus was not isolated from filtered throat washings; "(–)" indicates that the washings were made three days after the onset of the illness. An asterisk at the base of a curve indicates that the value was indefinite owing to the presence of non-specific agglutination due to the action of relatively concentrated human serum on the fowl red cells.

Two other methods for the recognition of virus in throat washings were tested. The first was to inoculate mice intranasally with the (non-sterile) paper filtrate and to make a subsequent test for immunity against strain "Melbourne". Five filtrates, which were shown to contain virus by amniotic inoculation, were tested in this fashion. The numbers of mice found immune for each filtrate were as follows: 0/3, 0/4, 0/4, 2/3, 0/3; that is, in only one instance was a positive result obtained.

The second method was one suggested by Hirst[2]—allantoic inoculation, with subsequent test of the allantoic fluid for red cell agglutination. Six membrane filtrates were tested in this way, and amounts up to one cubic centimetre were inoculated by tuberculin syringe and needle. Five of the six filtrates used were proved to contain virus by amniotic inoculation, but all failed to produce virus detectable by red cell agglutination in the allantoic fluid.

Table I combines the data obtained from these investigations of throat filtrates from influenza patients. From

TABLE I.

Primary Isolation of Influenza Virus from Throat Washings.[1]

Patient.	Amniotic Inoculation.	Allantoic Inoculation.	Mouse Immunization.	Virus Type.
ROW	4/4	—	0/3	A "Melbourne"
DOH	2/4	—	0/4	A "Melbourne"
B & B	2/4	—	0/4	A "Melbourne"
GRA	1/1	0/3	2/3	A "Melbourne"
LYE	0/4	0/4	0/4	—
HOB	1/4	0/3	0/3	A "Melbourne"
DOW	3/4	0/3	—	A "Melbourne"
GUL	1/3	0/2	—	A "Melbourne"
BAN	0/3	—	—	—
MCL	2/4	0/3	—	A "Melbourne"

[1] In each column the numerator represents the number of positive results and the denominator the number of chick embryos or mice which were tested. Non-specific deaths are excluded from the denominators.

the table it will be noted that only about half the embryos inoculated amniotically gave positive results (16/35). This suggests the advisability of using at least six eggs for each filtrate. In all probability the failure of some embryos to become infected is to be ascribed chiefly to differences in susceptibility of the embryos, although in some instances the variation may have been due to the fact that only a limiting infective dose was present in the inoculum. In an attempt to gain some light on this question a pool was made of the filtrates GRA, HOB and DOW about a fortnight after the filtrates had been prepared. In the interim they had been stored in the refrigerator. Eggs were inoculated amniotically with filtrate, undiluted and diluted to 1:10. Five and four embryos respectively survived to the fourth day and were then examined for evidence of infection (Table II). It will be seen that in each group all but one embryo became infected. Other points of interest are, first, that in the majority of embryos only the amniotic fluid showed evidence of infection, and secondly, that the Hirst test on amniotic fluid is a more sensitive index of infection than examination of tracheal smears.

TABLE II.

Results of Amniotic Inoculations of a Pooled Filtrate of Throat Washings from Three Influenza Patients.[1]

Material Tested.	Hirst Test.		Tracheal Smear.
	Amniotic Fluid.	Allantoic Fluid.	
Filtrate undiluted.	++	−	++
	−	−	−
	+++	+++	+
	++	−	±
	+++	−	−
Filtrate diluted 1 : 10	+++	−	++
	++	−	−
	+++	−	+
	−	−	−

[1] The symbols used for Hirst test results are described in the text. Under "Tracheal Smear" the number of "+" signs gives a rough indication of the numbers of specifically damaged cells present.

The same pooled filtrate was inoculated intranasally under anæsthesia into two ferrets. Both responded typically, Ferret 171 showing a primary "spike" of temperature reaching 105·6° F. and a pronounced secondary rise, Ferret 173 reached a temperature of 103·8° F. only in the early "spike", but showed also a moderate secondary rise. Serum taken four weeks later showed high antibody titre against strain ROW.

Finally, six mice received the filtrate intranasally under anæsthesia on two successive days. Three weeks later they were tested for immunity with the mouse-passage strain "Melbourne" (1:100 dilution of stock virus). One mouse only of the six tested showed immunity. It had no visible lesions in the lungs, either old or recent. All the others and four normal control mice were either dead or ill, with almost completely consolidated lungs.

Differential Activity of Early Passage Virus on Fowl and Guinea-Pig Cells.

It was noticed that the Hirst reactions given by amniotic fluids from embryos infected with primary filtrates were weak and of low titre. The two first strains isolated, ROW and DOH, gave titres of six and eight respectively with fowl cells. On the hypothesis that perhaps a certain amount of adaptation to chick tissues was necessary before fowl red cells were readily agglutinated, these fluids were also tested against human and guinea-pig red cells. Both gave better agglutination than fowl cells, and guinea-pig red cells gave slightly higher titres than human cells. In subsequent work, therefore, whenever full Hirst titrations were carried out, both fowl and guinea-pig cells were used and the titres were expressed in the form F/Gp. In each case the titre was the virus dilution giving "+" agglutination under the standard conditions. The F/Gp. ratios for the infected amniotic fluid obtained by primary inoculation from six of the cases were as follows: ROW 6/240, DOH 8/80, GUL 5/160, GRA 5/20, McL 4/256, 4/128, HOB 0/20. With passage all these strains soon gave ratios equal to or slightly greater than unity. With two strains GUL and DOW it was found that by the use of limiting dilutions for passage the initial "unadapted" ratio could be maintained for three and four passages respectively. ROW and DOH on the other hand gave values approximating unity on the second passage, even when highly diluted first passage fluid was used for the transfer. Further work on this phenomenon may throw some light on the nature of the processes involved in the adaptation of influenza virus to a new host species.

Adaptation of Strains to Mouse Passage.

In confirmation of previous experience with a strain isolated in 1940 (Burnet and Foley[3]), no difficulty was found in adapting strains isolated by the amniotic method to produce typical lesions in mice. The three strains ROW, DOH and B & B were used, and the series was initiated by the inoculation of four mice to each strain with second egg passage allantoic fluid. The inoculation was repeated next day (Taylor[3]), and two days later two mice of each set were killed for passage. The other two were left for seven days and then examined for pulmonary lesions. An emulsion of two half-lungs from the mice killed at three days in four or five cubic centimetres of broth was used to inoculate four more mice, and the same procedure was carried on for ten passages, except that in the eighth, ninth and tenth passages only a single inoculation was given. All three strains behaved similarly, and in Table III are shown the lesions produced with the successive passages of ROW. Only the mice allowed to survive for seven days or till they died naturally are included.

TABLE III.

Adaptation of ROW Virus to Mouse Passage.

Number of Passage.	Lesions.[1]	Titration of Tenth Passage.
1	2 1	Undiluted: 4^0 4^0 4^0
2	2 0	10^{-1}: 4^0 4^0 4^0 4^0
3	2 0	10^{-2}: 4^0 4^0 4^0
4	3 1	10^{-3}: 3 2 0
5	4^4 4^6	10^{-4}: 3 2 2
6	3 1	Mice killed on tenth day.
7	4^0 4^0	
8	4^0 4^0	
9	4^0 4^0	

[1] The mouse lung lesions are represented according to the usual convention, 4 representing complete consolidation with death on the day shown by the index figure.

By the tenth passage strain ROW was producing typical lesions, and the titration shown indicates that it is of the same degree of virulence as an average strain developed from material isolated by ferret inoculation.

The Serological Type of the Strains Isolated.

The development of the red cell agglutination technique by Hirst has made it possible to "speed up" and simplify the serological classification of virus strains. Apart from a brief discussion in the monograph of Burnet and Clark,[3] no account of the classification of the A subtypes by the method has yet reached us. Our own work indicates that with ferret immune serum the subtypes W.S., "Melbourne" and GAT are as sharply distinct by Hirst tests as in the orthodox mouse tests used previously. Also in conformity with previous work, the strains of TAL and CHR in our possession appear by Hirst tests to be serologically equivalent to "Melbourne". In studying ROW as a representative strain of the present epidemic, therefore, we have compared it and the homologous ferret immune serum F 172 with virus and immune serum corresponding to the three A subtypes and the only available B strain ("Lee"). The tests were made by adding a constant amount of immune serum to a series of doubling dilutions of virus and determining the serum/virus ratio corresponding to the "+" end-point of each combination. For each of the samples of immune ferret serum a 1:100 dilution in saline solution was used. The B immune serum was a high titre rabbit antiserum and was used diluted to 1:500. The same stocks of virus and serum were used for all the tests combined in Table IV. The figures given represent the

TABLE IV.

Serological Identification of Strain ROW as of "Melbourne" Type (Hirst Tests).[1]

Serum.	Virus. W.S.	MELB.	ROW.	GAT.	B (Lee).
W.S.	33	4	8	6	4·5
MELB.	2·2	16	16	4	3
ROW	6	30	66	14	12·5
GAT.	4	5	10	66	8
B (Lee)	<1	<1	<1	<1	40

[1] The numbers signify the volumes of stock virus neutralized by a single volume of the standard serum concerned. Details are given in the text.

number of volumes of stock virus neutralised by one volume of serum, on the assumption (verified both by Hirst[3] and by ourselves) that the virus/serum ratio at the neutral point is independent of the absolute concentrations. If, for example, a mixture of 1:100 serum and 1:4 virus gives a "+" reaction, the corresponding value in the table is 25.

The close relationship between the strains ROW and "Melbourne" can be seen most clearly when the relative activities of different types of serum are examined with each virus. Table V is constructed from the data in Table IV to show the activity of serum F 172 (ROW) relative to each of the other types of serum when tested with each virus. It will be seen that, except for a slight difference in favour of the homologous activities, serum ROW is qualitatively identical with serum "Melbourne" and approximately three times as active. When similar comparisons of ROW with W.S. or of ROW with GAT are made, there is no such regularity in the quantitative relationships.

TABLE V.

To Demonstrate Close Relationship between ROW and "Melbourne" Strains.

Tested Against Virus.	Relative Activities of Immune Ferret Serum. ROW/MELB.	ROW/W.S.	ROW/GAT.
ROW	4·0	8·0	6·6
"Melbourne"	1·8	7·0	5·6
W.S.	2·7	0·18	1·5
GAT.	8·5	2·3	0·22

All the other strains isolated were tested in less extensive experiments against the standard types of immune ferret serum, and all gave reactions which did not differ significantly from those of ROW.

Further verification of the serological character of ROW was obtained by measuring the activity of the corresponding ferret immune serum F 172 against the egg-adapted W.S. and "Melbourne" strains on the chorio-allantois. The tests were made according to the usual methods and gave results corresponding to a reduction of W.S. to 2·6% and of "Melbourne" to 0·003%. The close relationship of ROW to "Melbourne" is again obvious.

Serological Responses in Patients.

Blood samples were obtained from a number of patients in each of the camps being studied, including all those from whom throat washings were taken. A second sample was obtained from thirty of these patients between fourteen and twenty-one days later. The serum was inactivated and stored in the refrigerator for thirty to seventy days before being titrated according to the method described above.

Figure I shows the antibody changes observed between the first and second occasions on which blood was taken from these patients. All these tests were carried out within a fortnight, the same batch of the strain ROW virus being used throughout. During the same period a similar series of titrations with the same reagents was carried out on 36 specimens of serum from a group of normal soldiers taken in February, 1942—well before any influenza appeared in the camps. In Figure II the initial antibody titres of the two groups are compared. It will be seen that the initial antibody titres are significantly lower in the patients with influenza than in the normal subjects, the geometrical mean of the patients' serum being 30 and of the control group 48.

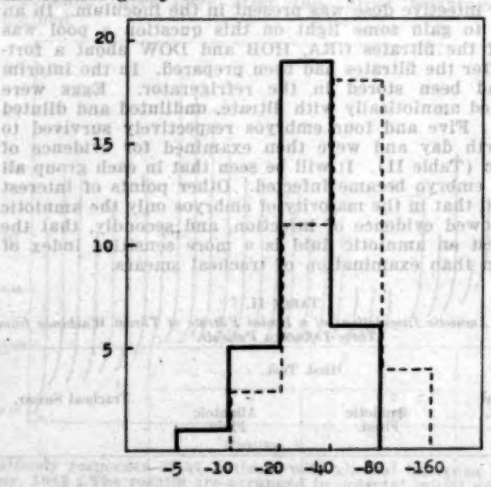

FIGURE II.

A comparison of the initial titres of 31 influenza patients with 36 unselected soldiers. The number of subjects in each group of antibody values is shown—patients by a heavy line, normal subjects by a broken line. The antibody values are in arbitrary units.

Only one of the patients from whom two blood samples were obtained showed no significant rise in antibody; the other 29 showed antibody rises against the homologous strain ranging from twofold to more than thirty-fold increases. The single subject who showed no rise in antibody was also tested against the other A subtypes and against B; no rise was shown by any of these tests.

A limited series of titrations was made against the other subtypes of influenza virus A. The results so far obtained suggest that the rises observed in antibody titre against strains "Melbourne" and GAT are equivalent to those obtained against ROW. With strain W.S., on the other

hand, nine serum pairs showed significantly lower (sometimes much lower) antibody rises, five about the same and two significantly higher. The antibody changes against "Swine" also bore little relationship to those observed with ROW. In two instances there were no detectable amounts of "Swine" type antibody in either the first or the second specimen of blood taken, despite typical homologous rises, and seven other specimens of serum showed "Swine" rises significantly smaller than the homologous. Three rises were approximately the same and three were significantly greater, one specimen of serum providing the following figures in two sets of experiments: ROW 2x, 1·5x; W.S. 4x, 3·5x; "Swine" 14x, > 12x.

These differences are being further investigated; but as they stand, they are sufficiently definite to indicate that Horsfall and Rickard's[9] conclusion from mouse titrations, that no immunological differences between the A subtypes can be detected by the use of adult human immune serum, is not universally valid.

Discussion.

This epidemic was in every respect a typical outbreak of virus influenza. It showed none of the equivocal characteristics of some of the recent English and American prevalences. Virus was readily isolated by the amniotic method and produced well-marked temperature responses in ferrets. Patients with typical symptoms showed a sharp rise in antibody in the fortnight following the illness. The only anomalous feature was the unusually early season at which the epidemic appeared. Influenza in Victoria is much more usual in late winter and spring than in April and May. Unusually cold wet weather in addition to camp conditions may have been wholly or partly responsible for the change in season.

The chief interest of the present work is the establishment of amniotic inoculation in association with the Hirst test as an effective and convenient method of primary isolation. The method has been effective in our hands in isolating virus from experimental infections (Burnet and Foley[10]) from a small epidemic due to a low-grade A type virus in 1940 (Burnet and Foley[6]) and in the present instance from a typical influenza A epidemic. The failures reported from England by Andrewes *et alii*[11] may have been due to several factors. The virus strains current in England in the winter of 1940-1941 were obviously more difficult to isolate in ferrets than our 1942 strains, and they may have been similarly less capable of initiating amniotic infection. Another factor mentioned in their paper is a seasonal difference in the susceptibility of chick embryos. During the winter, when primary isolations of the virus were being attempted, strains which in the summer months gave typical amniotic infections failed to produce visible infection. We have not observed this seasonal change in Australia. Furthermore, our present experience shows that tests of the amniotic fluids for Hirst agglutination of guinea-pig and fowl red cells greatly increase the ease with which positive results can be recognized. In several instances positive agglutination results verified by subinoculation were obtained in the absence of any unequivocally positive evidence from the appearance of the amniotic and tracheal fluid.

In view of the great advantages of being able to replace ferrets by chick embryos, we would suggest that the present work supplies a strong case for the recommendation that the standard method for primary influenza virus isolation should be amniotic inoculation of eleven or twelve day chick embryos. The presence of influenza virus in the amniotic fluid after four days' incubation at 35° C. is recognized by agglutination of guinea-pig cells and confirmed by amniotic passage. After the second passage, the embryonic fluids contain sufficient virus to allow serological work, and if standard types of immune ferret serum are available, a diagnosis of type and subtype may be made immediately. Occasionally, as in the case of strain ROW, this can be done with first-passage fluid, and in this instance, in three days after the first throat washing was obtained, we were able to show that the epidemic was in part at least due to the "Melbourne" subtype of influenza virus A. As a general rule, however, it is preferable to make one or two additional passages before undertaking serological tests.

A subsidiary point of interest is the change in the type of Hirst agglutination during the first few passages. All primary isolations produced fluids with a higher titre against guinea-pig than against fowl cells, but sometimes after a single passage and always after three or four, the normal equality of titre was gained. This phenomenon, in which an easy objective test of "adaptation" is provided by the red cell agglutination tests, should be a suitable object for the study of the nature of mutation in virus virulence.

The serological studies do little more than confirm the relatively homogeneous character of the epidemic, only one subject with typical symptoms failing to show a significant rise. The comparison with an unselected camp population confirms the general finding that susceptibility to influenza is significantly correlated with low initial antibody level, but that a relatively high antibody level in a person is no guarantee of his insusceptibility (Francis *et alii*,[12] Horsfall *et alii*[13]). In the course of this work with the Hirst test we have encountered a number of difficulties which will need further investigation before the test can be used for refined serological work. The first is the great difficulty we have found in obtaining completely reproducible results, unless tests were carried out on the same day with the same batches of virus and red cells. This has little influence on the apparent rise shown in direct comparisons of first and second serum samples, but it does introduce an element of uncertainty into the absolute initial values. It is our impression, from work at present being carried out, that non-specific inhibition by serum protein plays an important part in determining the initial titre shown by a given subject and that specific antibody inhibition is superimposed upon this non-specific effect. Until this aspect is clarified we do not feel justified in discussing the possible significance of the results of more detailed serological studies on these specimens of serum made by Hirst's method.

Summary.

1. An account is given of the clinical and epidemiological features of a typical epidemic of influenza A observed in military camps in Victoria during May, 1942.

2. By means of the method of amniotic inoculation of chick embryos, virus was isolated from eight of ten throat washings obtained from patients with influenza in typical form in the first two days of illness.

3. The virus strains obtained were serologically homogeneous and were closely related to the "Melbourne" subtype of influenza virus A.

4. Acute and convalescent serum samples were obtained from patients with typical symptoms; with only one exception they showed a sharp rise in antibody (by the Hirst red cell agglutination technique) against the current strain.

5. As compared with an unselected camp population, the initial antibody titres of influenza patients were significantly lower.

6. In the first and sometimes in a few subsequent passages, amniotic fluid virus was found to have a much higher Hirst agglutination titre against guinea-pig cells than against fowl cells. Adapted strains were found to have similar titres against both.

7. Virus isolated by the amniotic method can be readily adapted to mouse lung passage.

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SOME SURGICAL EXPERIENCES IN THE MIDDLE EAST.[1]

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I have been asked to tell you something of our medical activities in the Middle East, and I hope that I shall be able to make some of my experiences be of interest to you. I intend, during my talk, to refer mainly to the surgical side of our activities, and if I appear to concentrate on the bad results of treatment it is because I feel that more can be learnt by mistakes than by a recital of successful cases.

I left Australia as a member of the Second Australian General Hospital and remained with the unit until our return, except for a period of the first Libyan campaign and while the Syrian campaign was in progress. We did not function as our own hospital until Christmas, 1940, and during the preceding months we were scattered in various other Army jobs. I was fortunate in being attached to an English hospital at Alexandria for over two months just after Italy had entered the war.

While I was at this hospital, I had my first introduction to war surgery, and a very valuable introduction it was. At this hospital we received all Western Desert casualties and a considerable number of Naval casualties. The majority of Naval casualties were wounded Italians and were admitted to the hospital some two to four days or even more after being picked up from the sea. These casualties had all had dressings applied and been looked after as much as possible on a crowded destroyer. They were mostly suffering from shell wounds and burns.

Let me say a few words about the burns first. Several of these men were suffering from extensive burns of the face, chest, arms and legs. They had been treated with tannic acid, and by the time they reached us in nearly every case suppuration was occurring underneath the tan and the men were very ill. Hands and faces had been tanned, and also flexures. In two cases gangrene of terminal phalanges had occurred, which was probably due largely to tanning of the hands. The burns as a rule were superficial and caused by flash.

The first conclusion I reached about these cases was that tanning without thorough cleansing and preparation of the burnt area and of that immediately surrounding it was not without danger of subsequent death of the patient from sepsis. My next conclusion was that tanning of the hands was apt to lead to gangrene of fingers, and that it was wrong to tan a face.

Our treatment of these casualties was, although effective, laborious and crude. They were taken as soon as possible to the operating theatre after a large preliminary dose of morphine, and as much as possible of the tan was removed after soaking with saline solution. All bare areas were dressed with "Vaseline" gauze impregnated with 1% friar's balsam in "Vaseline". Areas which had been denuded of tan cleared up fairly rapidly; but in spite of soaking with swabs the tan was hard to remove, and it was many days before all the adherent tan was finally removed. Meanwhile the ward in which these casualties were was by no means pleasant to work in, particularly in an Egyptian summer.

I believe that these men would have had a much shorter convalescence, considerably less pain and discomfort, and considerably less toxæmia and ultimate scarring if we had adopted the following procedures: (i) complete immersion in a saline bath before any attempt to remove the tan was made; (ii) saline baths every day afterwards; (iii) the use of moist dressings of saline solution over *tulle gras*, with daily soakings of outer dressings in the saline bath; (iv) the use of cultural methods to determine local bacterial infections; (v) blood transfusions. I should like here to mention that the English Army sister in charge of these patients with severe burns worked tremendously hard with very little help, and it was owing to her that at least two of them recovered with very little scarring.

I should also like to mention here that we had one absolute failure in an attempt to "pinch graft" an extensive burn of both thighs, and that I am now sure that the failure was due to faulty preparation of the burnt area and faulty technique. At this stage we did not realize the value of bacteriological examination of granulating areas and of adequate preparation of a wound or burnt area for grafting. I shall refer to this subject later.

The gunshot wounds in these cases were mostly flesh wounds, compound fractures of the upper limbs and a few head and chest wounds. I have previously mentioned that they had all been received over twenty-four hours previously. We treated the casualties on the general principles of excision, provision of adequate drainage and removal of foreign bodies. Those who were very ill were in addition given sulphanilamide. Fractured limbs were treated in plaster casts.

It was disappointing to find that a wound which had been excised one day and from which a foreign body had been removed looked somewhat worse the next day; I believe now that our results would have been better if we had attempted no excision and had been content with enlarging wounds to provide adequate drainage and removing foreign bodies. I remember two men who had sustained badly comminuted compound fractures of the elbow joint who were treated conservatively and who responded in an amazing way to complete immobilization and suitable drainage.

I pass on now to casualties received from the Western Desert. I was in charge of a "septic ward", and the patients received had mostly sustained flesh wounds. Casualties were received from forward units, nearly all working under difficulties in dugouts. All wounds were

[1] Read at a meeting of the Western Australian Branch of the British Medical Association on May 20, 1942.

inspected as soon as possible after the patients' arrival. I did not see one sutured wound which was not pocketing pus, for the following reasons: (i) The wounds had not been excised thoroughly. (ii) Foreign bodies were not removed. It is better to do nothing to a wound than to sew it up over a foreign body and damaged muscle, and it is to be remembered that a compound fracture is an open wound. Other wounds were treated with packing, the inevitable result being a pocket of pus at the end of the tract and a surrounding cellulitis. The treatment, of course, was obvious. The explanation for packing of wounds at this period was (i) that resuscitation and blood transfusion were not fully organized and (ii) that competent surgeons were not at the time available to help the field units. Both these failings were soon remedied.

The treatment of some fractures was in a like manner incomplete, and the value of complete immobilization was not fully realized. For example, a plaster cast for both bones of the forearm might not include immobilization at the elbow joint.

In addition to casualties received from forward units we received a few casualties immediately after accidents and air raids; these were treated on the general principles about which I shall tell you later.

I should like to mention one case of a thoraco-abdominal wound;

The site of entry was in the left loin, and it was obvious that intraabdominal hæmorrhage was occurring. The course of the bullet was slightly upward. The abdomen was opened and the torn spleen was removed; a sucking wound in the diaphragm was closed. The patient's condition was good after the operation, but he nearly died of a pressure pneumothorax. There was no external sucking wound. When the condition was recognized he rapidly improved after aspiration of air from the chest once or twice a day for several days.

We were unfortunately replaced in September by new arrivals from England.

The Syrian Campaign.

I was fortunate in being detailed to an Australian surgical team during the Syrian campaign. For the first two weeks we were attached to a casualty clearing station while waiting a move forward, and as it was still receiving casualties at the rate of about 100 a night and of all nationalities, we were able to make ourselves useful; although having three competent surgeons of its own the staff of the casualty clearing station was not short-handed. A brief outline of the operating theatre technique may be helpful to any of you who in the future may have to organize a civilian operating post.

First, the surgeons used a large room, which is important. All sterilizing was carried out in an adjoining lobby. At one end of the operating theatre was a large table, on which were spread one or two sterile sheets. One end of the table was kept for sterile linen, jaconet, gowns *et cetera*, and the other for sterile instruments, dishes and sutures. All instruments were kept sterile and roughly separated into general and special groups. All dirty instruments were immediately washed, boiled and replaced on this table. Two sterile sheets covered the lot. The result was that no waiting for linen or instruments was necessary, no matter what was wanted, and after all, a secondary hæmorrhage is a condition that does not wait.

Two operating tables worked by one surgeon were in constant use at busy times. Anæsthetics were largely given by an orderly, and preliminary cleansing and shaving of wounds was carried out by another trained orderly. It was found that when there were only two surgeons on duty this was the quickest method, as the other surgeon was fully occupied in resuscitation and in the pre-operative and post-operative treatment and selection of patients for operation. A large part of the time in the treatment of battle casualties is occupied in cleansing, shaving *et cetera*, and a trained orderly can do this perfectly well, thus saving a medical officer for other work.

I shall not further describe work at the casualty clearing station, except to emphasize three points:

1. Patients, severely wounded, who had had resuscitation at a dressing station, almost invariably needed further resuscitation before active treatment could be undertaken. Moral: Treat patients after the first resuscitation.

2. Many patients had to be held at the casualty clearing station for many days. Moral: If surgical treatment is undertaken some provision must be made for post-operative nursing. Many casualties cannot just be put on the next ambulance which is leaving.

3. Guillotine amputations of the thigh may be life-saving; but they are a real hardship to the patient, and a skin flap without muscle which can be loosely sutured, either at the time or after a few days, is no more dangerous.

One week before the final Damour battle we moved up the coast to Damour, where we established ourselves at the main dressing station of a field ambulance. We were fortunate in our position. We had a large, two-storied house with enough room for a kitchen, a regimental aid post, two admission rooms and two operating theatres downstairs, and three post-operative wards and officers' living quarters upstairs. A wide staircase easily accessible to stretchers connected the two floors. In addition we had running water and a local electric light plant, which had miraculously escaped destruction by a shell.

The personnel of the main dressing station slept in the orange grove around the house, and a mobile army canteen was parked near by.

Our job was to treat all stretcher casualties from the Damour attack, and we did not receive walking wounded. One of our admission rooms was also the resuscitation room, and only severely wounded casualties were admitted here. Our methods of resuscitation were the following standard ones:

1. Heat was supplied by hot air from a kerosene stove, the patient lying on a stretcher, which was elevated on trestles, and over which a frame was attached and covered with blankets. The patient's head, of course, was outside.

2. Hot drinks were given. A constant supply of sweet tea was provided, both for patients and for the staff.

3. Morphine was given as required.

4. Intravenous therapy was used. The blood pressure of severely wounded patients was taken as a routine measure. Having no hæmoglobinometer, we often had to guess as to the extent of shock or shock and hæmorrhage, but one is generally fairly accurate in one's estimation. We used both dried and wet serum and for shock without much hæmorrhage both were excellent. Amounts up to 1,000 cubic centimetres were used. At one stage we were short of blood. We had no walking patients and were in a malarial area, so were not allowed to take fresh blood. Our shortage was due to our having to discard some of our reserve stock of blood. Our stocks were replenished by blood from the convalescent depot sent up packed in ice in insulated food boxes. If you have to treat severely wounded men, you will find that you need a considerable quantity of blood, and it is no use trying to operate on patients suffering from shock; you will kill them.

5. Patients were moved as little as possible while awaiting operation, unless it was necessary to check hæmorrhage.

6. As soon as they arrived, patients were given six grammes of "M & B 693" by mouth. It was found that they nearly all required resuscitation for one to three hours, so they were able to retain this amount of the drug in spite of the subsequent administration of an anæsthetic. All wounded were also given 3,000 units of antitetanic serum, and the absence of tetanus was either due to this, or to tetanus toxoid, or to both. I did not see one case of tetanus in the Middle East.

With the aid of a surgeon from the field ambulance we were able, by working shifts of sixteen hours on with eight hours off, to have two surgeons on duty. One surgeon was responsible for treating the severely wounded in our main operating theatre, and the other had the important job of examining new arrivals, controlling resuscitation and post-operative wards and operating on less severely injured

patients in the secondary operating theatre. Both operating theatres were worked on the lines I have mentioned. In the casualty clearing station in addition we had two medical officers as anæsthetists and to do the routine work of the main dressing station, which went on in conjunction with that of the surgical team.

Our first six days at Damour were quiet, but we were kept busy as soon as the action started. In all about 120 casualties passed through our operating theatres, nearly all during a rush period of four days. Our orderlies worked the same hours as we did, and they stood up to their task very well.

For anæsthetic agents we used a mixture of ether, chloroform and "Pentothal Sodium", and we employed a little local anæsthesia. We had no nitrous oxide and did not miss it; none of our deaths could be attributed to anæsthesia.

Let me now briefly describe our methods of treatment. They followed what are now generally recognized as standard methods. I should like here to mention that most wounds were multiple, and that it was rare to find a man with only one wound. Moreover, it is important to make a thorough pre-operative examination, not neglecting apparently trivial wounds, as a small piece of metal may not make much of a hole in the skin, but may cause a great deal of disruption inside. Furthermore, the thorough pre-operative examination of a badly smashed leg, especially as to nerve and blood supply, is essential when a question of amputation arises.

Casualties were operated on as fast as possible in the order of arrival; we were fortunate at most times in receiving them in a steady stream and not by convoy.

Let me revert to our methods of treatment.

1. All wounds (except those of the head, chest and abdomen, which I shall mention later) were thoroughly excised. By excision I mean excision of a damaged skin edge, a wide opening of deep fascia and an excision of all muscle which is apparently damaged. We found scissors most useful in excising muscle. The above-mentioned procedure sounds easy; but when one finds a small foreign body penetrating deeply, it is not so easy and at times impossible. However, at least adequate drainage is obtained. Foreign bodies, metal and clothes, were, of course, removed if possible; this was not always easy, as we had no X-ray facilities to help us. It is not easy to judge the extent or the direction of penetration in many cases. One small piece of metal went through the neck of a femur and came to rest in the pancreas after traversing the root of the mesentery. Through-and-through wounds, if superficial, were completely opened and excised. After excision wounds were well powdered with "M & B 693" powder; a "Vaseline" dressing was laid on the surface after the cavity had been filled with "Vaseline", and in many cases wounded areas were encased in plaster for immobilization. We had several cases of gas gangrene in casualties brought in after twenty-four hours. Many casualties did not reach the regimental aid post for twenty-four to thirty-six hours, and had an eight hours' journey from there. But so far as I know we had only one case of gas gangrene among casualties we had treated, and this was caused by a foreign body which had not been found at operation. For bleeding vessels we used linen thread and cut sutures very short. The method is both quick and effective and the foreign body left is small.

2. Fractures were treated exactly as other wounds, except for complete post-operative immobilization. All fractured limbs except femora were immobilized in plaster of Paris. Femora were immobilized by strapping and fixed extension in English Thomas splints.

3. Every effort was made to avoid amputation. We were forced to perform six amputations, two of which were for gas gangrene and three completions of partial traumatic amputations; the other man had had all useful muscles of the elbow blown away. We left skin flaps when possible, but cut the muscles in guillotine fashion.

Let me mention here that we continued to give blood transfusions during the operation and also afterwards.

4. We tried to be particularly careful in our excisions of wounds of joints and to close the synovial membrane. We were also careful to immobilize joints.

5. Chest wounds, if sucking, should be sutured at the regimental aid post with deep silkworm gut sutures. A surgical team should have a pneumothorax machine and be prepared to explore a thorax; but we found it unnecessary to do more than make sure that no chest wound was of the sucking type.

6. With regard to head wounds, we confined our treatment to the syringing away of extruding brain, the removal of superficial foreign bodies and closure of the wound. One casualty who had a middle meningeal hæmorrhage recovered.

7. The abdomen was opened if there was any suspicion about its condition. We completely missed one abdominal injury in the case to which I previously referred, the neck of the femur having been fractured. Of eight men with abdominal wounds, two had thoraco-abdominal wounds, two had ruptured kidneys in association with hollow viscus injury and four had no complicating visceral injury. These last four all lived. Two of the others we think would have lived if more blood had been available. For the remaining two the outlook was hopeless from the start, although one lived for two days after operation.

Ten deaths occurred. Two were due to severe head wounds. Four were due to abdominal wounds, all complicated by injury to a hollow or solid viscus or to both. Two of these casualties were extremely shocked on their arrival, having a systolic blood pressure below 70 millimetres of mercury. Two deaths were due to compound fracture of the femur; one of the men died whilst under light anæsthesia (this death was not due to the anæsthesia).

This soldier had arrived in a collapsed condition with a partial traumatic amputation of the thigh and with the limb not immobilized. Hæmorrhage was still going on, and we were unable to stop it bleeding. He was given a blood transfusion and was then lightly anæsthetized. He died while we were trying to control his hæmorrhage.

The other casualty had an unrecognized intraabdominal wound. Two deaths were due to severe buttock injuries with fracture of the pelvis. One of these men in addition had the driving band of a "75" encircling the upper part of his femur, and the other had multiple wounds of both legs.

If I may as the result of a very limited experience offer any advice to one who has done no emergency war surgery, it is this: Do not hurry; wait until your patient is fit for operation; know your anatomy, do a thorough job once you start; and be sure that your patient is fit to travel before you send him on.

Some Problems in a General Hospital.

Sepsis.

Sepsis presents many problems in the base hospital when one is treating war wounds, and from experience I should like to tell you of the methods of treatment we used. It was noted that practically every wound was infected by the time of the casualty's arrival at the hospital, and the treatment will be considered under the following categories: (i) Dependent and adequate drainage and removal of foreign bodies. (ii) Measures to maintain the patient's resistance and chemotherapy. (iii) Adequate immobilization of fractured limbs. (iv) Treatment of secondary hæmorrhage. (v) The difficult decision as to amputation.

Adequate Drainage.

I endeavoured particularly after some experience of fractures to make sure that every septic wound (and it is to be remembered that many of these casualties had sustained fractures) had adequate drainage, and that large foreign bodies were removed. The question of removal of foreign bodies is a difficult one, and I encountered several cases in which a fruitless and long search for a foreign body had resulted in a flare-up of latent sepsis in a wound. While I do not advocate the leaving of foreign bodies, I

believe that an ill-timed search without accurate localization is apt to do more harm than good. Provided that no fracture is present, most septic wounds heal rapidly once the source of the sepsis is removed and adequate drainage is established. Let me tell you the story of a case that went wrong, owing, I now believe, to faulty treatment during the patient's early stay in hospital.

The patient was one under my care; he had been admitted to hospital in June in a condition of toxæmia, suffering from a gunshot wound with a compound fracture of the left femur. The wound was anterior; the bone was considerably comminuted, and some small foreign bodies were scattered round the fracture site; one larger piece of metal had been removed through the anterior wound. With the exhibition of "M & B 693" and the application of extension to the limb this man's condition apparently improved, but he remained pyrexial, and there was a considerable amount of discharge from his anterior wound. In view of his general improvement nothing further was done.

Two weeks after this I was sent to Syria, and on my return in six weeks took over his care again. By now he was very ill and becoming emaciated; he had had what seemed to be pneumonia, but this later turned out to be a pyæmic infarct, since he developed a pulmonary abscess. An attempt had been made to drain the thigh, but it was not adequate. Pus by this time had tracked up the muscle planes and the thigh was almost a bag of pus. About three weeks after my return I was forced to amputate this man's thigh through the fracture. After this procedure his condition improved and the stump did well. The operation, by the way, in view of the shrunken nature of such thighs, is not very difficult to perform; one of the main troubles is to obtain enough flap, if a number of incisions have been made. His pulmonary condition seemed to be satisfactory, and he was coughing up about half an ounce of pus per day. However, his abscess burst into his pleural cavity. He was kept alive by suction drainage, which was not easy on account of a bronchial fistula. At the time of his departure for Australia he had a half-expanded lung (which was still expanding) and a chest free of fluid, and his bronchial fistula had closed. He still had a small tube in his chest with a little discharge. His amputation stump was healed except for an area where a flap had sloughed.

I believe that if adequate drainage of the infected fracture had been instituted, with removal of obviously dead bone and foreign bodies soon after his admission to hospital, the patient would have been spared a terrible ordeal.

A similar casualty in the same ward, admitted at about the same time, rapidly recovered after the establishment of adequate drainage and the removal of a large foreign body, and when he was sent home five months later the bone had united and the wound had healed.

Measures to Sustain Resistance to Infection.

I am convinced that long-continued chemotherapy is not of much value. However, in the early stages a full course should be given, and if later surgical treatment is necessary I am sure that chemotherapy before and after operation is of value. It is no use wasting "M & B 693" on a man whose trouble is an abscess that has inadequate drainage.

We used blood transfusion extensively. One of my patients, who eventually recovered, received twenty pints of blood during his six months' stay in hospital, and I am convinced that it was only due to blood transfusion that he maintained enough resistance to combat his sepsis and allow his fracture to unite. He had a comminuted fracture of the femur just below the trochanter, together with a partial sciatic nerve lesion (peroneal division). Incidentally, this man was a prisoner of war for thirty-six hours before the first aid post was recaptured by us. It was three days before he had effective primary treatment, although the Germans did what they could for him. A hæmoglobin value below 60% in the presence of sepsis or before grafting is an indication for blood transfusion. I saw no reactions from repeated transfusions, provided fresh blood was used. Blood was given by the drip method.

Needless to say, we gave these patients a good diet and extras when they were available, such as fruit, "Marmite", egg-flips *et cetera*; they were also given as much fresh air and sunlight as was possible. The nursing staff worked extremely hard to prevent pressure sores.

Adequate Immobilization of Fractures.

When adequate drainage has been established and the above-mentioned measures have been taken, the next problem is adequate immobilization. If a fracture is to be immobilized, the joints both below and above the fracture must also be effectively immobilized. In many cases this was not done, so I hope that you will excuse me if I point out some of the failures.

1. In fractures of the wrist and lower part of the forearm, in many cases the elbow was not immobilized, and this is really important.

2. To immobilize fractures about the elbow joint and the lower end of humerus, as with fractures of the rest of the humerus, it is necessary to apply a full plaster spica; the best results were obtained when the spica immobilized the spine down to the iliac crests. If a full long spica is not applied, a certain amount of shoulder movement is always possible. To avoid frequent changing of the plaster spica I found that the cutting of a window to allow of occasional dressings did not cause harm, provided adequate pressure was maintained over the exposed area when the next dressing was applied. I am convinced that the good results obtained with the plaster spica are mainly due to adequate immobilization. It was very gratifying to see a man admitted to hospital and to observe the improvement in his condition in a few days after adequate immobilization of a septic fracture.

3. In fractures of the ankle joint the same rules apply as in fractures of the wrist; the knee must be included in the plaster spica.

4. Fractures involving the knee can be adequately immobilized only in a hip spica, but unfortunately this was not always possible on account of pressure sores.

5. If anyone can tell me how to immobilize a compound fractured femur completely while maintaining position, I shall be very pleased. We treated such patients in extension with a Kirschner wire through the tibia in a bent Thomas splint or occasionally a Hodgen splint. I believe that these patients are better treated by combined fixed extension and limb extension in a straight Thomas splint, but as you all know, no method has yet been proved satisfactory. The average surgeon cannot effectively treat them in a plaster spica for the following reasons: (*a*) Frequent changes of the spica are necessary, on account of the smell and the profuse discharge. (*b*) Plaster spicas are difficult to apply to maintain anatomical fixation. (*c*) Each change of plaster means mobilization of the fracture. (*d*) The wasting of the thigh is rapid, and a tight plaster cast one week is a loose one the next. (*e*) Bed sores under a plaster cast in the presence of sepsis grow overnight.

Secondary Hæmorrhage.

I mention a few words about secondary hæmorrhage as after all it is due to sepsis. If a man has a large secondary hæmorrhage from a gunshot wound with a severe fracture of the leg or thigh, and if this hæmorrhage cannot be controlled by finding a local bleeding vessel or by temporary packing, I believe that he is better off if an immediate amputation is performed. I say this from experience of ligation of the femoral artery proximal to the bleeding point. My experience is small; but I did not see one such patient who had not eventually to have an amputation, and in each case an immediate amputation would have been a kindly act for the soldier concerned. I think that the arm is a different proposition, and amputation must be avoided at all costs.

The Difficult Decision as to Amputation.

"Avoid amputation at all costs" was our idea when we first started work. Now I am not so sure, as a result of my own perhaps bad attempts to treat septic gunshot

wound fractures, whether it is a good one. I have already given you my views of the best course of action if a severe secondary hæmorrhage occurs. I have also had personal experience of five further cases, two cases of septic arthritis following gunshot wound of the knee and three of gunshot wound with compound fracture of the femur. One of the men who had sustained a gunshot wound of the knee had gross loss of bone and also involvement of the other knee. Two of the men with fractures of the femur died after operation; in both instances pus had tracked up behind the inguinal ligament and incubation of the blood produced cultures. The other man with a fracture of the femur (complicated by a sciatic nerve lesion) survived, and it was amazing to see the change in this man one week after operation. From a man apparently "down and out" he had a new outlook on life, and he became the life and soul of the ward.

I do not wish to advocate amputation; but I do wish to emphasize that it may be left until too late, and after all, it is better to lose a limb than a life.

The Prevention or Delay of the Healing of Wounds.

I do not propose to discuss sepsis further, but to pass on to the problem of preventing delay in the healing of wounds. Major B. K. Rank, Officer in Command, Plastic Unit, has been invaluable in teaching us a little about wound treatment. My reason for bringing this problem forward is the wastage in manpower which can be caused by inadequate wound treatment at the base hospital.

Diagnosis.

A careful examination must be made of every wounded casualty admitted to one's care and a decision made as to line of treatment.

The following are important points to note:

1. Be sure that foreign bodies are removed and that no pockets of pus are present. Examine wounds radiologically if there is any doubt.

2. Estimate the amount of skin lost. A large, gaping wound of the thigh may mean very little skin loss. Where a large amount of skin has been lost, fresh skin will have to be formed, and unless grafting is used, healing will be slow and scarring excessive.

3. All wounds should be studied bacteriologically. The streptococcus is the main cause of slow healing of wounds, owing to its digestive powers. Also, of course, one finds diphtheritic and other infections. A wound from which a heavy growth of streptococcus is obtained is unsuitable for skin grafting.

Treatment.

The anti-bacterial treatment of a wound varies according to the type of infection. For streptococcal infections, "M & B 693" powder should be used, and the wound covered with *tulle gras* and wet saline dressings. The dressings should be kept wet and firm pressure should be maintained on the wound. For staphylococci and *Bacillus proteus* infections eusol should be used instead of saline dressings and "M & B 693" omitted. For *Bacillus pyocyaneus* infections acetic acid (2% strength) should be used.

The aim of treatment is to cause a wound to heal (*a*) so that return of function will be rapid, (*b*) so that scarring will be avoided and (*c*) because if plastic treatment is necessary, it is much easier to deal with a healed wound.

Many wounds not associated with much skin loss heal rapidly under the anti-bacterial treatment I have described, especially if it is combined with daily saline baths (2%). I have found that most wounds heal more quickly if the "closed plaster" technique is not used; however, remember that between saline baths the wound should, if possible, be immobilized by a plaster cast or other means.

The "closed plaster" technique in my opinion is not of much value in a hospital for open non-complicated wounds. It is excellent if patients have to be transported and for the treatment of compound fractures; but wounds associated with skin loss do not "heal up like magic" if a limb is encased in plaster. In many cases unhealthy redundant granulations occur and the healthy growing edge of skin is lost. So do not put on a plaster cast and expect a wound to heal, or you will often be disappointed.

Most of our wounded were received too late for secondary suture; but this is a most valuable method of treatment for some wounds, especially for soft tissue wounds that have been adequately excised and which are associated with little actual skin loss. Bacteriological examination of tissue and correct anti-bacterial treatment should be carried out prior to suture. It is useless to try to suture a grossly infected wound.

Chronic Wounds.

Chronic wounds are due to excessive skin loss, to ineffective treatment and to delay in skin grafting. I am, of course, assuming that no septic foreign body or fracture is present.

In many cases, after the wound has been carbolized, it and any scar tissue may be completely excised and sutured. If this is done, it must be done without tension on sutures, and care must be taken to prevent hæmatoma formation and resultant infection under flaps. Careful after-treatment in the way of effective dressings must be carried out.

Skin Grafting.—For immediate healing of wounds two types of skin grafts are simple to use, pinch grafts and Thiersch grafts. Pinch grafts are really small, whole-thickness skin grafts; they are cut with a knife, applied directly to the granulating surface and maintained in position by firm pressure dressings. They are particularly valuable in the rapid healing of wounds, as they will take even in an infected wound provided that no excessive growth of streptococci is present. Thiersch grafts are not so easy to cut, but are very effective to obtain rapid healing. The technique of using them is easily acquired. A Thiersch graft will not take successfully over an infected wound. Clinically, a healthy wound has bright, firm granulations and a healthy, growing epithelial edge; but it is always advisable to make a cultural examination for streptococci.

Recent Wounds Associated with Extensive Skin Loss.

With regard to recent wounds associated with extensive skin loss, I stress again the importance of early healing. If such a wound is healed quickly by skin grafting, the plastic surgeon later will have cause to thank you if a plastic repair is necessary. Extensive fibrosis and contractures are avoided. Do not let wounds granulate too slowly; they will heal in time, but it is bad surgery, and later operations are more difficult. Take, for example, a smashed hand with skin loss; if you can obtain early healing it will lead to early recovery of function, to avoidance of permanently stiff joints, to less formation of fibrous tissue and to subsequent easier plastic repair in a sterile field. It is much better to fail with pinch grafts than not to try to use them, and it is much better for the end result to be a hand with mobile joints than one from which function is permanently lost. There is one final case, which convinced me of the value of the saline bath:

A man had lost all the skin on both buttocks. He was pyrexial and toxæmic, his temperature varying between 101° and 104° F. After one week in the saline bath his temperature was practically normal and his wounds were healthy. One week later both buttocks were Thiersch grafted and two weeks later both had healed. Weeks of suffering and sepsis were avoided.

Aseptic Precautions.

Finally, remember that you and your nursing staff are often the cause of infection in wounds. Be careful of your asepsis; wear a mask if you are treating open wounds, and make the sister do the same; and bear in mind that dust, flies *et cetera* also play a part in cross-infection in wards.

The Medical Journal of Australia

SATURDAY, OCTOBER 24, 1942.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

Reference to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

SOME RECENT INVESTIGATIONS IN INFLUENZA.

On more than one occasion F. M. Burnet has declared that there is every reason to fear the recurrence within a year or two of pandemic influenza which wrought such tremendous havoc in 1918-1919. During recent years many earnest workers, of whom Burnet is one of the most prominent, have been tireless in their quest for fresh knowledge on the subject of influenza and many additions have been made. In the introduction to their important monograph issued recently from the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Burnet and Ellen Clark point out that it is not easy in the light of the newer knowledge to interpret the course of such a pandemic as that of 1918-1919. They believe that until modern methods have been applied to a major pandemic we shall not be in a position to grasp the full story of influenza; at the same time it is not likely that we shall "make full use of the brief and tragic period of a pandemic unless there is a clear idea available beforehand of what needs most urgently to be determined". There is thus every reason why those engaged in the practice of medicine should try to make themselves conversant with the latest additions to knowledge about influenza. From time to time reports of work on the problem, chiefly from Dr. Burnet and his co-workers, have been published in this journal, and abstracts of reports of work carried out overseas have also appeared. In the present instance our intention is to draw attention to the paper by F. M. Burnet, W. I. B. Beveridge, Diana R. Bull and Ellen Clark, published in this issue, and also to mention one or two recent investigations reported in other journals.

The present communication by Burnet and his co-workers is of the greatest interest and may well be considered in relation to a report by Burnet and M. Foley, published in this journal in December, 1940. In that report the two authors described the results of intranasal inoculation of modified and unmodified influenza virus strains in human volunteers. They sprayed on to the mucous membrane of the upper respiratory tract of fifteen persons an attenuated virus. Though the virus had no protective effect, Burnet and Foley pointed out that the experiment provided a clear indication of the value of amniotic inoculation in influenza research—it showed that unlimited amounts of "high titre sterile virus" could be prepared in a convenient form and of any desired degree of virulence; it also showed for the first time that virus can be isolated by the amniotic method from human throat washings. They found that susceptible human beings differed in some essential respects from ferrets and mice in regard to their reaction to attenuated influenza virus. They assumed as a working hypothesis that the most important factor in preventing a "take" of the attenuated strains was the presence of the virus-inactivating agent of Burnet, Lush and Jackson in the nasal and probably also in the tracheo-bronchial secretions. If this was so, the problem of immunization by living attenuated strains was either to select a strain resistant to the virus-inactivating agent or to restrict the output of this agent temporarily by some pharmacological manœuvre to give an opportunity for infection to be initiated. They thought that only egg-grown viruses administered by the natural route seemed to offer the required potentialities of immunizing agents. Readers will note that in their present paper Burnet, Beveridge, Bull and Clark claim the establishment of amniotic inoculation in association with the Hirst test as an "effective and convenient method of primary isolation". (In the Hirst test the red blood cells of fowls are agglutinated by infective material containing a high concentration of influenza virus.) It is not surprising that they look on their work as supplying a strong case for the recommendation that the standard method for primary influenza virus isolation should be amniotic inoculation of eleven or twelve day chick embryos.

A report of active immunization against epidemic influenza comes from the Department of Health in New York City.[1] M. Siegel, R. S. Muckenfuss, M. Schaeffer, H. L. Wilcox and A. G. Leider have studied the results of immunization in an epidemic of influenza A which occurred in 1940-1941 at Letchworth Village. This village had an average population for the year of 3,800 persons who comprised all grades of mental defectives of both sexes and all ages. From 1937 onwards the inhabitants had received prophylactic injections of vaccine. Two types of vaccine were used—one in which four strains of influenza A vaccine were pooled and the subjects were given a single subcutaneous dose, and the second about four times the strength of the first, a single dose also being given by the subcutaneous route. The second vaccine was an influenza A and canine distemper X vaccine. Siegel and his collaborators describe their observations in considerable detail. For our present purposes it will suffice to state that the vaccines failed to reduce significantly the incidence of acute respiratory illness due to all causes or of respiratory illnesses serologically related to influenza A. This it will be noted is similar to the conclusion reached by Burnet and Foley; it is also to be remarked that in one investigation the subcutaneous method of administration was used and in the other vaccine was sprayed onto the respiratory mucous membrane. Siegel and his fellow

[1] *The American Journal of Hygiene*, March, 1942.

workers make interesting observations on the levels of antibody in the blood. Half of those in a group in which the level of antibody in the blood was known, manifested a significant rise in titre. At the same time cases in which this rise in titre was found could not be distinguished clinically from those in which no rise in titre occurred. This kind of observation has been made by Clara Nigg, C. M. Eklund, D. E. Wilson and J. H. Crowley[1] who studied an epidemic of influenza B occurring in a mental hospital while an epidemic of influenza A occurred simultaneously in the same neighbourhood. The clinical features of these two types of illness were indistinguishable, but the serological findings were entirely distinct. As a matter of fact Nigg and her fellow workers mention several cases in which serological evidence was obtained of simultaneous influenza A and B infection in the same individual. The point that we wish to make is that in the infections described by Siegel and his co-workers there was no evidence of influenza B.

Reference has already been made to the observation of Burnet and Foley that human beings differ in some essential respects from ferrets and mice in their reaction to attenuated influenza virus. Three of the subjects on whom they experimented had influenza and all three had low initial antibody values. The only other subject with a low antibody level showed a very active subclinical antibody response. All the other subjects had relatively high initial antibody levels and none suffered from influenza, although four showed evidence of subclinical infection by a rise in antibody titre. G. K. Hirst, E. R. Rickard, L. Whitman and F. L. Horsfall, working in the laboratories of the International Health Division of the Rockefeller Foundation, New York, have investigated the antibody response of human beings following vaccination with influenza virus.[2] At the outset these workers observe that because the Hirst test could be applied with relative ease to large numbers of specimens of serum, it was possible to undertake a large-scale study of the antibody response to vaccination of human beings with influenza viruses. Antigens were made from pooled strains of influenza A and B virus with certain additions. Adult male subjects in State institutions were inoculated subcutaneously after a preliminary bleeding; bleeding was also carried out two weeks later. The existence of an epidemic of influenza A enabled these workers to apply similar tests to the serum of patients who had contracted the natural disease. An enormous variation in antibody response was noted in persons with identical prevaccination levels and poor responses were seen in cases in which the prevaccination level had been high. The addition of distemper X virus did not increase the rise of antibody or its duration in the subjects tested. Variations in the dose of the virus up to many times that used in the initial experiments caused an increase in the antibody response, but this increase was in no way proportional to the increased dosage. Inactivated virus did not produce a higher titre than active virus. It will be remembered that Burnet and Foley stated that with some reservations it was justifiable to conclude that in susceptible human beings the administration of an amount of unmodified virus enormously greater than would be received in the course of natural infection produces precisely the same effect as the natural infection. Hirst and his collaborators remark that though there appears to be some relationship between specific circulating antibodies and resistance to clinical infection, there is also considerable evidence which indicates that persons possessing the highest normal levels of circulating antibody are still susceptible to influenza. They also think that since the increased titres which follow vaccination rapidly decrease with time, there is reason to think that whatever degree of increased resistance might result from the administration of a particular influenza vaccine would also become progressively less effective with the passage of time.

In the foregoing discussion the two most important points have to do with the method of administration of influenza vaccine—injection or spraying onto the respiratory mucous membrane—and antibody titre in relation to the efficacy of vaccination. Examples of work carried out by the two methods of administration have been mentioned. Each method has its advocates. Which is the better has yet to be decided; probably Burnet and Clark are right when they aver that "it is most unlikely that any decision as to the relative efficiency of subcutaneous or intranasal immunization in preventing pandemic influenza will be made without actual pandemic experience". Much the same kind of statement holds in regard to decisions about antibody titre. Hirst and his collaborators hold that the only satisfactory test of the possible efficacy of vaccines against influenza is extensive field trial under carefully controlled conditions.

[1] *The American Journal of Hygiene*, March, 1942.
[2] *The Journal of Experimental Medicine*, May 1, 1942.

Current Comment.

THE TERMINATION AND AFTER-EFFECTS OF PNEUMOTHORAX TREATMENT.

Although the invention of the pneumothorax treatment of pulmonary tuberculosis was one of the most important advances of modern medicine (more important by far than the discovery of the tubercle bacillus) and at once brought a new lease of life to countless sufferers, its acceptance has been grudging in some quarters and its application has been pursued with very varying enthusiasm in different countries and in different centres of treatment in the same countries. This is so because the indications for the treatment are so elastic, the mode of action is so obscure and complex, the potential complications are so dangerous, and the time during which pneumothorax should be continued is so variable and subject to controversy that its employment and management are still very much of an art and much less of a science; also because the end result is so often short of cure of the disease for which the treatment is undertaken. Theoretical considerations and experiments and, above all, observations of large numbers of patients treated by pneumothorax and the collation of these have greatly aided our grasp of the possibilities, technique, pitfalls and limitations of the treatment; but there is still plenty of room for future study.

Some important observations on an aspect of pneumothorax treatment that has not received much attention have recently been made by B. D. Potter, of Jersey City, who has examined a group of 118 patients one to eight years after the termination of pneumothorax treatment and investigated the state of their health and of their lungs.[1] The analysis of the pulmonary lesions for which the treatment was instituted shows that the patients were

[1] *The Journal of Thoracic Surgery*, June, 1942.

well assorted in respect of the severity of their disease, as they were in their ages also. Forty-four of the patients had pneumothorax treatment on both sides. During the course of the treatment pleural effusion occurred in 100% of the patients, and the effusion was "more extensive" in 70%. Pleural adhesions were present in 143 of the 162 pneumothoraces, but their division was deemed necessary in only four instances. There were five cases of empyema, but all yielded to repeated aspiration of oleothorax. A controversial point upon which the study shed light is the fate of the contralateral lung. There were twelve patients in whom the pneumothorax was bilateral from the start. In 31 cases the lesions were essentially unilateral and two of the patients in this group developed disease in the opposite lung three and four years respectively after termination of the pneumothorax. The remaining 75 patients presented infiltration with or without small cavities in the untreated lung; the disease progressed in 32 of these so that they required bilateral pneumothorax; in eight it remained stationary and in 35 it improved. Potter considers that with the pneumothorax treatment of unilateral disease the chances that a lesion will occur in the opposite lung are very small, while when the disease is bilateral at least one-third of the patients are likely to improve so much as practically to convert the therapeutic problem to one of unilateral disease.

A minimum period during which it was intended to maintain a pneumothorax for the treatment of tuberculosis was fixed by Potter and varied according to the size of the cavities present: cavities of less than 2·5 centimetres in diameter would receive collapse therapy for eighteen months to two years, reckoning from the time "effective collapse" was obtained to the time of full reexpansion of the lung; cavities of 2·5 to 3·5 centimetres in diameter would be treated for two and a half to three years and so on, cavities over 5·0 centimetres in diameter being treated for five years or longer. Such a scheme would certainly meet with little approval in this country, where the tendency among those who practise pneumothorax treatment is towards much more caution, and Potter himself declares that his study does not give the much desired answer to the question of how long an effective pneumothorax should be maintained and he urges treatment according to the apparent requirements of the individual patient.

The most interesting part of Potter's study concerned the fate of the treated lungs after their reexpansion. In 126 cases in which the lungs were "voluntarily" allowed to reexpand (as distinct from the "involuntary re-expansion" which unavoidably took place before the appointed time in 26 cases) recurrence of disease took place in only five cases and that after intervals varying between eight months and three years: after "involuntary re-expansion" relapse occurred in six out of the 26 cases. The author makes the statement that relapse is much more likely to occur if effective pneumothorax is maintained for less than eighteen months, but beyond this it seems to be a matter of chance whether reactivation of the disease will take place after reexpansion of the lung.

Another finding from examination of the reexpanded lungs was that an impressive degree of resolution of the tuberculous infiltration had taken place during the treatment in all but a few cases. Except for the cases of recurrence of disease, the lesions in the reexpanded lungs remained stationary afterwards, except in a few instances in which further resolution occurred during periods as long as two years after reexpansion. Such good results are worthy of congratulation, especially as 110 of the 118 patients were ambulant at the time of the report, although at the same time it will be conceded that they were a selected group who had completed treatment and not 118 consecutive patients followed through from the commencement of treatment.

Potter concludes his paper by "reiterating and emphasizing" several points in the technique of terminating pneumothorax treatment, which have been mentioned by other authors. When the decision is made to abandon a pneumothorax, he states, the interval between refills should be shortened: thus "high negative pressures with their resultant mediastinal deviations are avoided" and "a slow and steady traction on the lung is established". By the prevention of deviation of the mediastinum, he explains, points of fixation between the visceral and parietal pleura are avoided and thus recollapse of the lung can be established at any time prior to full reexpansion if reactivation of the disease occurs. In his experience full reinflation of the lung under these conditions takes from three to nine months. The deviations of the mediastinum referred to do not appear to be of common occurrence when the lung is not fibrotic. When the lung is fibrotic or when any considerable degree of pleural symphysis exists, the "voluntary" reexpansion of the lung is all too rarely achieved. However, the emphasis laid by Potter upon method in the termination of artificial pneumothorax will be stimulating to those who have followed no special technique other than close observation for signs of recrudescence of disease during this important phase of the treatment.

ALCOHOL AND MORALE.

In another place in this issue we publish the report of a committee appointed by the Society of Returned Medical Officers of Queensland to consider the effects of alcohol on leadership and efficiency. The members of the committee were Professor John Bostock, Research Professor of Medical Psychology in the University of Queensland, Professor W. Kyle, Professor of Philosophy in the University of Queensland, Dr. B. F. R. Stafford, Director of Mental Hygiene, Queensland, Mr. P. M. Hamilton, Principal of the Boys' College and President of the New Education Fellowship, and Dr. N. V. Youngman, Psychiatrist, Brisbane Hospital. This is a subject which should hold the interest of every medical practitioner in Australia and indeed of every Australian who thinks of the welfare of his country in the present world crisis. If we agree that excessive consumption of alcohol is prejudicial to morale, we must, as a nation, be prepared to do something about it—and the first thing that we shall have to do is to make up our minds to submit to a little discipline. Of the constructive suggestions put forward by the Society of Returned Medical Officers of Queensland, two seem particularly worthy of attention. The one is that the alcoholic content of beer should be reduced and the other that spirituous liquors should be rationed. Next in importance is the view that "shouting" should be prohibited. No one would have reason for complaint that discipline was excessive if these suggestions were adopted. Perhaps it will be well to recall some statements by Colonel A. Graham Butler in the second volume of his history "The Australian Army Medical Services in the War of 1914-1918". He states that for commissioned officers dependence on alcohol was, with the exception of senescence, probably the most frequent immediate cause of failure to "make good" in the field. "On Gallipoli it was the direct cause of one major military tragedy." In the rank and file "the cycle from private to sergeant and back was a quite authentic experience". "In lads under 18 alcohol played havoc." One of the most cogent arguments in favour of the suggestions of the Queensland returned medical officers is the fact that they have been adopted by the Council of the Queensland Branch of the Returned Sailors, Soldiers and Airmen's Imperial League of Australia.

INVENTIONS AND THE WAR.

Inventions may be a large factor in the winning of the war. Many medical practitioners are what has been called "gadget-minded". If they have any ideas or suggestions about new apparatus or equipment, whether connected with medical work or not, they should communicate with the Army Inventions Directorate in their own State.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Chicks in Virulence Testing.

Martin Frobisher, Elizabeth Parsons and Ts'un T'ung (*The American Journal of Hygiene*, May, 1942) have studied the use of chicks in testing the virulence of *Corynebacterium diphtheriæ*. They conducted parallel tests on rabbits and chicks with 1,000 strains of corynebacteria. Seven to twenty day-old chicks of the stronger breeds were used, and inoculated after a twenty-four hour period of rest and feeding. The cultures were injected in doses of 0·5 to 1·0 cubic centimetre into the subcutaneous tissues over the insertion of the right wing, antitoxin-protected controls also being prepared. No statement was made as to the technique adopted with rabbits. When the tested strains were virulent, 79% of the chicks died in twenty-four hours, 12% died in forty-eight hours, and a few survived longer and showed wing paralysis. Little difference could be found in the behaviour of *gravis* and *mitis* strains, and the agreement with the results in rabbits was 99·7%. The authors approve of the method, and find the birds easy to manipulate.

Classification of Viridans Streptococci.

Mathilde Solowey (*The Journal of Experimental Medicine*, July, 1942) has attempted a serological classification of viridans streptococci with special reference to those isolated from subacute bacterial endocarditis. Strains were also obtained from human throats and extracted teeth, and a few from other sources. Immune sera were prepared in rabbits, antigens were prepared after the Lancefield extraction method, and cross reactions were performed between all sera and all strains of streptococci. In addition the cultures were tested for salt tolerance and thermal resistance, and finally the pH of the medium was determined. Analysis of the results showed that while almost one-third of the strains could not be classified, the remainder fell into fourteen serological groups. No distinction could be drawn between strains from patients with endocarditis and those from normal throats or infected teeth. The author points out that while this may be due to inadequate technique, on the other hand, if there is no difference in strains, it at once alters the importance of the presence of such streptococci and their ease of invasion of the blood stream. She believes her classification has a value according to the use to which it is put.

Morphology of Vaccinia Virus.

R. H. Green, T. F. Anderson and J. E. Smadel (*The Journal of Experimental Medicine*, June, 1942) used the electron microscope to examine the particles of vaccinia virus. They centrifuged an emulsion to purify the particles, and then allowed a small portion of washed virus to adhere to a thin collodion membrane, washed it in distilled water and saline solution, and submitted it to the electron beam. Photographs showed that the particles had a limiting membrane and an internal structure of areas of condensation which showed a high degree of regularity. The bodies could be disintegrated by treatment with alkali, and their structure so altered. Similar treatment of the supernatant fluid from the centrifuged material, and from a control experiment in which triturated rabbit kidney was used in place of virus suspension, failed to show similar bodies in any but the virus suspensions. The authors pointed out the difference in morphology between vaccinia virus and the crystalline plant viruses.

Chemical Constitution and Antiseptic Activity.

S. D. Rubbo, A. Albert and M. Maxwell (*The British Journal of Experimental Pathology*, April, 1942) have extended their work on the influence of chemical constitution on antiseptic activity by a study of the mono-aminoacridines. Five such compounds were worked out, and it was noted that the series showed variations in basicity due to the addition of the amino group in different positions on the parent nucleus. Three types of test for antiseptic activity were devised: (*a*) the effect on bacteria, (*b*) their toxicity for mice, and (*c*) their effect on leucocytic phagocytosis. The tests were carried out in duplicate and with extensive controls, and the fact emerged that when the compounds were arranged in increasing order of bacteriostatic and bactericidal activity and of increasing toxicity it also corresponded to that of increasing chemical basicity and increasing readiness to pass from oil to water. The most active antiseptic compound also had the advantage of not staining the skin. This 5-aminoacridine might have a distinct sphere of usefulness, and clinical trials had given encouraging results.

Löffler Medium Preparation.

N. E. Goldsworthy and Harold Wilson (*The Journal of Pathology and Bacteriology*, April, 1942) have investigated the preparation of Löffler's medium in relation to the morphology of *Corynebacterium diphtheriæ*. The increasing use of tellurite media has led to the identification of many *gravis* strains missed on the Löffler medium. Specimens of the medium produced in different laboratories and inoculated with identical pure cultures, showed wide variations in morphology, so that the method of preparation became suspect. Many factors were investigated, including time of heating, range of temperature, source of serum used, and the effect of various forms of enrichment. It was proved that the use of sterile glucose broth and horse serum sterilized by filtration, and heated only for the purpose of inspissation, gave the best results. This was adopted as the standard medium with which all others were compared. The addition of 5% glycerol improved the production of metachromatic granules, but unfortunately it did this also for strains of *Corynebacterium hofmani* also. The authors showed that the quality of the ingredients of their medium could be altered by prolonged heating at 85° C. or by autoclaving, or by substitution of human or hog serum for horse serum. Some batches of horse serum did not give quite such good results as others, but they were always satisfactory. The authors adopted a mixture of four parts of filtered horse serum and one part of sterile glucose broth inspissated for two hours as the most satisfactory formula for recognizing the *gravis* form of *Corynebacterium diphtheriæ*. Little difficulty is encountered with other strains of the bacillus.

Influenza B in Southern England.

Dora Lush, C. H. Stewart Harris and C. H. Andrewes (*The Journal of Experimental Pathology*, December, 1941) have reported experiments on the occurrence of influenza B in southern England. They worked with virus first isolated by Francis in south-eastern United States of America and California, and identified by him as being antigenically distinct from the more common A strain. They used the mouse protection test with human serum, mouse lung suspension being used as the source of antigen to determine the presence or absence of antibody in serum taken at the onset and fourteen days after convalescence from an influenza-like illness. Amongst 38 specimens of serum tested, nine were "positive" to A virus and eight to B virus, while over half the specimens were "negative" to both viruses. The authors state that symptomatically the illnesses were not distinguishable, but that clear proof was obtained of the presence of antibodies to each strain of virus.

Feeding of Mice with Encephalitis Virus.

C. G. Harford and J. Bronfenbrenner (*The Journal of Infectious Diseases*, January-February, 1942) noticed that some mice whose newly born young had been inoculated intracerebrally with the virus of St. Louis encephalitis died from nine to eleven days after they had eaten their young. Passage of the brain of the dead mother through normal mice showed that the virus was the probable cause of death. This particular variation of feeding experiment for the production of infection was followed, and it was established that such a method was successful. Wild mice were also tested and found to be susceptible to virus ingested with the dead newly born young. Some mice were sacrificed before symptoms were established, and virus could be recovered from the spleen a few days after the infected feeding had occurred. No reason could be found for the fact that virus ingested with the bodies of newly born young was more frequently the cause of disease in the feeder than when infected adult brains were eaten. It did not, however, appear to be due to the presence of a larger amount of virus.

Macroscopic Agglutination Test for Leptospiral Jaundice.

Elizabeth B. Starbuck and Thomas C. Ward (*The Journal of Infectious Diseases*, January-February, 1942) have made a comparison between a recently developed macroscopic agglutination for the diagnosis of leptospiral jaundice and the standard microscopic test. The antigen for the latter was a culture of *Leptospira icterohæmorrhagica* in Noguchi's semi-solid medium, used in 0·2 cubic centimetre amounts and mixed with an equal amount of diluted serum, then incubated for one and a half hours at 37° C., and examined by dark ground illumination. The antigen for the macroscopic test was a formalinized concentrate of a culture of the organisms in a liquid medium, to which was added a trace of gentian violet. One drop was mixed on a ruled glass plate with serial dilutions of serum,

rocked for ten minutes and then examined for the presence of blue granules over a white background by diffuse transmitted light. A series of specimens of serum from normal, syphilitic and jaundiced patients was examined; some of the jaundiced patients suffered from leptospiral jaundice. The tests proved to be specific, comparable to the microscopic test, but less sensitive. Similar results were obtained in clinical cases of the disease in the active stages, but the result of the macroscopic test became "negative" earlier, when the microscopic test still gave positive results in dilutions of less than 1 in 100. While it was felt that in a large survey mild degrees or inapparent infections might be missed, the test nevertheless had its place in the rapid diagnosis of leptospirosis.

HYGIENE.

Diphtheria Immunization.

JOHN PHAIR (*American Journal of Hygiene*, March, 1942) has studied the reactions of adults to the intranasal administration of diphtheria toxoid. Student volunteers were arranged in groups according to (i) a previous attack of diphtheria, (ii) artificial immunization, (iii) an absence of history of diphtheria, but proof of contact found by the presence of antitoxin in the blood serum, or (iv) an absence of history of diphtheria and less than $^1/_{100}$ unit of antitoxin per millilitre of serum. Sensitivity to proteins was also tested by the intradermal administration of toxoid. After a month concentrated formol toxoid in glycerine was instilled into the nostrils, the head being inverted over the back of a chair. A minute intradermal injection of toxoid was made at the same time. Serum antitoxin levels were estimated one month after the last treatment. Four treatments at intervals of two days were used. Of the 12 subjects with a negative history and no antitoxin, 11 gave no response; of the 35 who responded, 33 gave evidence of response to previous contact. The intradermal administration of extremely small doses of toxoid is valuable, and intranasally instilled concentrated toxoid is of even greater value to those already responsive to diphtheria antigen. While the intranasal administration of toxoid is relatively harmless and requires no expert ability, instillation in six cases caused reactions which prohibited its further use. These six subjects had shown violent reactions to the intradermal injection of toxoid, but these soon passed off. As toxoid sensitivity is less often met with in children, a trial of the method seems justified.

Equine Encephalomyelitis (Western Type) in Alberta.

A. C. MCGUGAN (*The Canadian Public Health Journal*, April, 1942) discusses equine encephalomyelitis in Alberta in 1941. During the summer and fall of 1941, the incidence of encephalomyelitis in horses was high, and 42 cases were reported in human beings. Twenty specimens of blood out of 28 tested gave positive results. Of the eight cases in which negative results were obtained, three proved to be due to ileo-colitis and one to malignant tumour of the brain. Eight deaths were reported. The highest incidence was in the age group fifteen to twenty-four years. Of blood samples in cases not recognized as encephalomyelitis, eight out of eighteen gave positive results on examination. Typhoid fever, poliomyelitis, ileo-colitis and influenza were mistaken diagnoses. Two of the patients said that they had been bitten by "an ugly black fly", not the common horse-fly.

Nutrition and Child Health.

E. W. MCHENRY (*The Canadian Public Health Journal*, April, 1942) states that in Toronto, among low-income working families, it was found that the fathers were the best fed, the young children were the next best fed, and the older children and the mothers were the most poorly fed of all. The diets were poor in calories and protein. Only the fathers had enough calcium and iron; the children received only half their due of calcium, since they drank only half a pint of milk a day. The diet was poor in vitamin B_1 and vitamin *C* also. In the "teen" age, the diet of girls, besides being poor in vitamin B_1, had a low calcium content. The girls did not take milk, as they wished to be thin, and thought milk was fattening. Yet they ate more pastry and cake than the boys, and their calorie intake was greater. Ignorance of how to choose and buy the right foods and of how to cook food so as not to spoil the vitamins is common. Education of adults reaches always only part of the people. Good food habits ingrained into children will in after years do better. Nutrition should be taught in school as a part of healthy living. A balanced diet is needed, rather than the use of special vitamin preparations.

MEDICINE.

Sudden Death.

IN a review of ten cases of sudden death and therefore brought to the notice of the coroner, G. V. LeRoy and S. S. Snider (*The Journal of the American Medical Association*, December 3, 1941) discuss the ultimate cause of the fatal event and suggest, on experimental grounds, a sound therapeutic approach to the problem. They indicate that the sudden death of a patient with disease of the coronary arteries is rarely instantaneous in the sense that a person appears perfectly well one minute and is dead the next. It is clear, however, that such sudden deaths are preceded by a few or many symptoms and these should be recognized as serious. The duration of these symptoms varied from three hours to ten days and they consisted of substernal oppression, mild pain, "indigestion", brachial pain and discomfort unrelated to injury. From post-mortem studies it was obvious that the myocardial infarct resulting from the coronary lesion and responsible for the sudden death need not be so large that muscular failure is the cause. It is pointed out that a myocardial infarct usually causes some symptoms, even though they may be mild. Experimental work on myocardial infarction by the ligation of the coronary artery in dogs is then reviewed and the conclusion is reached that the sudden death of a patient with infarction of the myocardium is due to a reflex coronary vasoconstriction whose stimulus is the infarct, whose afferent pathway is the cardiosensory innervation and whose efferent pathway is the vagus. The result of this reflex vasoconstriction in a susceptible person is fatal ventricular fibrillation. Rest in bed is, of course, distinctly beneficial; but the fact that atropine will depress vagal activity suggests its use in large doses (grain one-seventy-fifth to one-fiftieth) and this is of very great value in dogs in the prevention of the general coronary vasoconstriction. The active coronary vasodilatory drugs (xanthine derivatives, theobromine and theophylline grains seven and a half to ten every four hours) also proved valuable in the experimental work, the mortality rate being markedly reduced. Cardiosensory denervation is another method of preventing generalized coronary vasoconstriction from reflex causes. It is remarked, however, that not all patients with mild symptoms suggesting myocardial involvement will recover, but the mortality rate should be reduced from 75% to 30%. Morphine, although essential for pain in some cases, was shown to render dogs more liable to die and it should therefore be used with caution.

Toluene.

L. GRUENBURG, M. R. MAYERS, H. HEIMANN AND S. MOSKOWITZ (*The Journal of the American Medical Association*, February 21, 1942) describe the effects of exposure to toluene in industry. Toluene is used in aeroplane paints, and it has tended to replace benzene (benzol) in other industries. One hundred and six painters in an aeroplane factory were examined. There were 51 spray painters, 25 dip painters and 30 brush painters, all exposed to toluene for periods varying from two weeks to five years. Five men had perforations of the nasal septum, thought to be due to zinc chromate in the spray, and 32 men had enlarged livers. Eight men had a diminished red cell count, and eighteen had raised hæmoglobin values, and lymphocytes were increased in 20% of cases. None of the men had any symptoms of ill health; 34% had definite macrocytosis. Means were taken to protect the workers from fumes by exhaust fans and adequate ventilation. Nevertheless the men were exposed to between 100 and 1,100 parts of toluene per million during working hours. There was a similar exposure to other hydrocarbons which were not regarded as toxic in the amounts inhaled.

Results of Serologic Tests for Syphilis in Non-Syphilitic Persons Inoculated with Malaria.

L. E. BURNEY, J. R. S. MAYS AND A. P. ISKRANT (*American Journal of Public Health*, January, 1942) report that in eleven psychotic patients (*dementia præcox*) syphilis was excluded by the use of two "negative" blood serum tests and one "negative" spinal fluid. All were infected with malaria, either by mosquito or by blood from non-syphilitics. After ten paroxysms quinine cleared up the condition. Reactions to serum tests were given by each patient. The first as a rule was not obtained till the febrile stage about six days after inoculation, the last twelve days or so after quinine was given, the total period extending about four weeks. The greatest proportion of positives was noted at fifteen to twenty-one days after the onset of fever. A diagnosis of syphilis based solely on serum tests should not be made in an area where malaria is endemic unless it is first determined that malarial infection is not coincident.

Medical Societies.

THE SOCIETY OF RETURNED MEDICAL OFFICERS OF QUEENSLAND.

The following letter and report have been received from the Honorary Secretary of the Society of Returned Medical Officers of Queensland. Both letter and report have been sent to many persons in the public life of Australia and also to various organizations. Further mention of them is made in the editorial columns in this issue.

Sir: The frequency of excessive drinking amongst our troops and its deleterious effect upon morale, both military and civilian, have given the members of our society cause for much concern.

Alcoholism is a behaviour problem often with serious effects on bodily health—we therefore consider it is encumbent on us to take an active part in endeavouring to minimize its physical and moral effects.

After earnest consideration by the committee of the society it was decided to obtain a report by experts concerning the effects of alcohol on leadership and efficiency. We felt that advice could best be given by leading psychologists and educationists and therefore invited the following men to form a committee and report their conclusions to us: Professor J. Bostock, Research Professor of Medical Psychology (Queensland University); Professor W. Kyle, Professor of Philosophy (Queensland University); Dr. B. F. R. Stafford, Director of Mental Hygiene, Queensland; P. M. Hamilton, Principal, Boys' College, and President of New Education Fellowship; Dr. N. V. Youngman, Psychiatrist, Brisbane Hospital.

We submit herewith their report which shows clearly the grave menace of alcohol to our national well-being.

In submitting it to you and urging appropriate action, we wish to state that we are not destructive critics, we have no political bias and are not prohibitionists. We are men of experience who saw active service in the Great War and are familiar with conditions in this war.

It will be noted that the report stresses that any considerable amount of alcohol is destructive to maximum efficiency both mental and physical.

We feel very strongly therefore that excessive drinking should be abolished amongst both officers and men lest the resulting lowering of efficiency imperil the nation's success in battle and cause needless loss of precious lives. In the case of the men it is bad enough, but the seriousness cannot be overstated in the case of officers on whose individual physical efficiency and mental alertness so much more depends.

The effects of excessive drinking among the troops on leave leads to all types of crime and venereal disease and often engenders bad feeling amongst allied soldiers. In camp the administrations of the canteens should make excessive drinking practically impossible. Certain instances have come to our notice where drinking in officers' messes has been excessive and here particularly such a state of affairs should also be made impossible as in the case of the men.

If action is not taken leadership and discipline must suffer. There will be inefficiency and incompetence and the war effort must lag. All cases where excessive drinking continues should be dealt with and officers who cannot or will not conform should be removed from responsible positions.

As a constructive contribution we urge that the following reforms, which have proved successful in other countries, should be introduced forthwith.

1. In France the light beers and wines, although proving an enjoyable distraction, and giving mild stimulation, rarely cause drunkenness. We therefore recommend that the alcoholic content of all beer be considerably reduced. During the last war, in England, regulations were enforced by the Liquor Control Board whereby light beers contained not more than 2% proof spirit.

2. In Sweden there are no restrictions on the sale of light beer, but all spirituous liquors are rationed. In Australia now coupons are needed for the purchase of clothes and tea. We recommend that they should be used also for all spirituous liquors.

3. There should be prohibition of incentives to excessive drinking such as treating, credit and canvassing for liquor orders. These measures were practised successfully in England during the last war.

4. The soldier needs entertainment—many worthy people are doing their utmost to provide these facilities, but much more assistance is required so that their organizations can be greatly extended.

5. More facilities should be provided to encourage people to drink at tables instead of standing at bars.

6. No alcohol should be allowed on battle stations except the amount required for regulation issues.

7. The attitude towards alcohol drinking should be changed by a vigorous educational campaign.

In conclusion we wish to state that we are wholeheartedly with Mr. Curtin when he said: "I put it as plainly as I can, this is a war for absolute survival on which no compromise is possible."

This demands the introduction of every measure possible to safeguard our race.

Yours, etc.,

L. J. Jarvis Nye, President,

E. O. Marks, Honorary Secretary.

Report of Committee Appointed by the Society of Returned Medical Officers of Queensland to Report on the Effects of Alcohol on Leadership and Efficiency.

The purpose of this report is to show how alcohol affects the average man and woman, rather than to consider unusual effects. We shall discuss three aspects, the effect of alcohol, the dangers of alcohol, and the effects particularly important in times of war.

The Effects of Alcohol.

This can be conveniently considered in two sections, firstly the results of the taking of alcohol on one occasion, and secondly the effect of the prolonged taking of alcohol.

1. *The Effect of Alcohol on One Occasion.*—The earliest effect is a very slight stimulating action. It occurs with very small amounts of alcohol. Many authorities deny that such a stage does occur. This phase is then followed by a number of reactions which are injurious to the whole body. We stress that although the whole body is affected our main concern is with the effects on the nervous system. These direct effects are:

i. Skilled movements are done less accurately, more slowly, and are less well coordinated.
ii. The ability to learn and remember is lessened.
iii. The ability to concentrate and attend to any task is less active.
iv. The ability to think and reason is impaired.
v. There is also an emotional effect resulting in a sense of well-being with relief from immediate cares and a loosening of speech.

These effects are supported by laboratory tests. In one experiment errors increased by 20% after the taking of the equivalent of two average whiskies, and by 113% after six whiskies (McDougal). We must also stress that these effects occur long before the person is drunk. Because of the emotional effect he cannot realize that his efficiency is impaired.

It must be emphasized that every person is susceptible to alcohol, but certain people can tolerate it much less than others. The results of the taking of a lot of alcohol are obvious to all. We wish merely to point out these earlier effects and their attendant dangers.

Delayed Effects of "Hangover".—These are important if the person has not time to sleep off the effect of the alcohol. It creates a general feeling of malaise. This impairs efficiency.

2. *The Results of Chronic Taking of Alcohol.*—The functioning of the body is undermined, and again we only stress the effect on the nervous system. Firstly, all the finer functions of the mind are impaired, ultimately leading to loss of mental efficiency, and to moral degeneration. These are really the prolonged appearances of the upsets that we have already considered. The chronic alcoholic is often popular and appears well on the surface. He does not realize his condition, and we may well say that the man who can carry his liquor is often carrying his coffin.

The Dangers of Alcohol.

i. The effect on the finer mental faculties as enumerated above needs no further comment. The danger particularly arises if unexpected actions or decisions are called for while under the influence of alcohol. On active service conditions this may well lead to unnecessary loss of life and defeat.

ii. The use of alcohol to relieve cares and at social functions fosters carelessness in talk. This is a serious danger in wartime.

iii. Lowers resistance to infection. A man under the influence of alcohol is more susceptible to infection. Physical fitness in all military, industrial or social undertakings is thus seriously impaired.

iv. Production of crime. Alcohol accounts for 40% of all the more common offences dealt with in public courts; 25% of all cases of violent crime, such as murder, manslaughter and those inflicting grievous bodily harm (Gollancz).

v. Venereal disease. Recently the Queensland Minister for Home Affairs announced an alarming increase of this disease. Drunkenness in wartime, as is well known, enormously increases the incidence of venereal diseases, with a consequent loss of manpower and moral stamina.

vi. Addiction to alcohol. This usually starts in a male at the age of twenty and in a female at thirty. The significance of this factor in present-day living is too obvious to call for further comment.

The Causes of Alcoholism.

1. The commonest cause arises from the following cycle—curiosity about drink leads to imitation of others. So a habit is formed, and the disease alcoholism ensues. This must be a frequent occurrence where men go on leave without recreational facilities, where men are inadequately occupied, and where youths receive excessive wages.

2. Escape from reality or reality dodgers. A frequent instance is the inability to face worries or problems. It is a paradox that alcohol is used to conquer danger or death. Yet it merely results in being less fit to deal with any such dangerous situations.

3. Alcohol is often a symptom of a person who is not normal.

The Effects of Alcoholism.

These apply equally to the army and civilians, particularly civilians in war production. The effects are the same in each and the importance depends on where the individual is placed.

1. *Efficiency.*—Total warfare demands maximum efficiency from every person. Every person must be fit. The above considerations show how manual and mental work can suffer from alcohol. Also alcohol often means loss of sleep and appetite which further impair efficiency. In times of crisis the man who drinks to excess through physical weakness and muddled mind is a liability and endangers the lives of others.

As well as the effect on the individual there is also the effect on the efficiency of groups of people. For instance, in a factory or battalion *esprit de corps* disappears because alcoholics do not pull their weight and scoff at those who do not drink. In industry absence from work frequently follows from indulgence in alcohol as after pay-day.

2. *Morale.*—The will to succeed needs self-discipline and perfect fitness. The abuse of alcohol makes this impossible. The liquor interests and the evil effects of drunkenness are undoubtedly dividing the nation when unity is so essential. Many responsible citizens regard drink as the most serious enemy within our gates.

3. *Leadership.*—Good leadership demands good health, self-discipline, sound judgement and the ability to set a good example. How then can these be done by a chronic drinker who has to make vital decisions at critical times? When officers expect the same alcoholic pleasures as in pre-war days it is obvious that they either cannot take their war work seriously, or the tasks are too much for them. There must be discipline among civilian and army leaders, otherwise they sacrifice their country on the altars of popularity and personal pleasure. The final responsibility rests with our army and political leaders.

Medical Practice.

THE RALSTON TRUST, VICTORIA.

The following letter, addressed to the Medical Secretary of the Victorian Branch of the British Medical Association by the Public Trustee, 412, Collins Street, Melbourne, C.1, is published at the request of the Medical Secretary. We are informed that the income of the Ralston Trust is approximately £300 *per annum* and it should be noted that the benefits are limited to residents of Victoria.

Dear Sir: Some years ago, I understand that my predecessor, Mr. Phillips, was in touch with you concerning the Ralston Trust administered by this office. Under the terms of the Trust, the Trustees are empowered:

> "to expend under the advice of the Public Trustee in Victoria for the cure (if possible) of persons reported by him as 'suspected' of mental infirmity and for the restoration to complete mental capacity (if possible) of persons reported by him as recovering from mental disease."

I feel that the existence of the Trust is unknown to many of your new members, and may have been lost sight of by others, and I would therefore be obliged if the matter could again be brought under the notice of your members.

In practice, it is necessary that I be furnished with a medical certificate setting out the disability of the person desiring assistance, and the certificate should disclose if there is a possibility of a mental breakdown occurring should treatment not be provided. Alternatively, if it is a case where treatment is recommended to assist in recovery, the certificate should indicate this. I then ascertain if the applicant's financial circumstances are such that I would be justified in defraying the cost of treatment, the assistance being confined to persons in straitened circumstances. In the past, it has been usual to provide approximately £12 in each individual case to enable the applicant to obtain a holiday or rest in some country home for a period of from three to four weeks, or to obtain special treatment recommended by the doctor attending the applicant. The results over a number of years have, in almost all cases, been very satisfactory.

Thanking you in anticipation of your assistance,

Yours faithfully,

(Signed) J. E. Don,
Public Trustee.

National Emergency Measures.

THE USE OF QUININE IN TONIC PREPARATIONS.

The following amendment of Control of Medical Equipment Order, dated September 19, 1942, has been issued under National Security (Medical Co-ordination and Equipment) Regulations.

In pursuance of regulation 7 of the National Security (Medical Co-ordination and Equipment) Regulations, I, Samuel Roy Burston, Chairman of the Central Medical Co-ordination Committee, acting upon the recommendation of the Medical Equipment Control Committee, hereby make the following Order:

The following paragraph is added after paragraph 7 of the Control of Medical Equipment Order:

"8. Notwithstanding anything contained in any enactment relating to standards for drugs and medicines in force in any State or territory of the Commonwealth—

(*a*) a person shall not use any quinine in the preparation of Syrupus Ferri Phosphatis Cum Quinina et Strychnina (Easton's Syrup), Syrupus Hypophosphitum Compound, Syrupus Triplex (Three Syrups) or any similar type of tonic preparation in syrup, tablet or liquor form for which a standard formula including quinine is stated in the British Pharmacopœia, the British Pharmaceutical Codex, the Australian and New Zealand Pharmaceutical Formulary (A.P.F.) or other official book of standards; and

(*b*) during such time as the restrictions imposed by this paragraph on the use of quinine remain in force, the preparations referred to in sub-paragraph (*a*) of this paragraph may be made up without the inclusion of quinine, and may be sold under their official names or recognized trade names, if they comply in all other respects with the official standards."

Dated this nineteenth day of September, 1942.

(Sgd.) S. Roy Burston,
Chairman, Central Medical
Co-ordination Committee.

CONTROL OF DRUGS AND MEDICINAL PREPARATIONS.

The Pharmacy Board of Victoria has prepared for the information of pharmacists a summary of restrictions on the supply of drugs and preparations under orders and regulations issued by Commonwealth Government departments. This summary is published herewith by special permission of the Pharmacy Board of Victoria.

Drug.	Commonwealth Department Controlling.	Nature of Commonwealth Restriction.	Remarks.
Antimony and Potassium Tartrate. Antimony and Sodium Tartrate. Atropine and Salts. Chinchonum Compounds, such as Quinoxyl, Yatren, Loretin. Emetine and Salts. Ergot and all preparations and Alkaloids thereof. Filix Mas and Extracts. Hyoscine and Salts. Liver Extracts for parenteral administration, such as Anahaemin, Campolon, Examen, H.C.L., Hepastab, Hepatex-T, Liver Extract B.D.H., Liver Extract Intramuscular (Parke, Davis & Co.), Neo-Hepatex, Pernamon, Reticulogen. Local Anæsthetics, such as Butyn, Decicain, Diocaine, Metycaine, Percaine, Tutocaine. Nikethamide Compounds, such as Coramine, Icoral, Sol-camphre, Anacardone. Olmum Iodinatum Preparations, such as Iodatol, Iodinol, Iodipin, Lipiodol, Neo-Hydriol, and other analogous iodine compounds, such as Abrodil, Perabrodil, Tenebryl, Iodoxyl, Pyrechtan, Uropac. Organic Arsenic Compounds, such as Acetarsol, Acetylarsan, Devegan, Kharophen, Orarsan, Spirocid, Stovarsol, Neoarsphenamine, Neo-Kharsivan, Neo-Salvarsan, N.A.B., Novarsan, Novostab, Mapharsen, Tryparsamide, Treparsol, Carbarsone. Paraldehyde. Physostigmine and Salts. Procaine Hydrochloride, and all proprietary brands of p-amino-benzoyl-diethylaminoethanol; also all related drugs used by percutaneous injection for local or spinal anæsthesia. Quinidine and Salts. Sulphonal. Sulphonamides and preparations allied to or derived from sulphonamides, whether described as M & B 693, Prontosil Album, Streptocide, Colsulanyde, Prontosil Red, Proseptasine, Soluseptasine, or by any other trade name. Synthetic Antimalarials, such as Quinacrine, Praequine, Plasmoquine, Atebrin.	Control of Medical Equipment Order issued by the Chairman, Central Medical Co-ordination Committee, Department of Defence. (First Schedule.)	These drugs and all preparations containing any proportion of them may be supplied only on a prescription of a medical practitioner or veterinary surgeon.	Prescription should indicate maximum number of times it is to be dispensed. If it does not, may be dispensed once, repeated once, and must then be cancelled. A record of all drugs included in this order which are used or sold must be kept in the Prescription Book. This applies to all prescriptions, including those dispensed for members of Friendly Societies under Lodge Agreements.
Quinine Alkaloid and Quinine Salts.	Control of Medical Equipment Order issued by the Chairman, Central Medical Co-ordination Committee, Department of Defence. (Second Schedule.)	These drugs and all preparations containing them in any proportion may be supplied only on the prescription of a registered medical practitioner. Medical practitioners may be requested to prescribe Quinine and Quinine Salts only for Malaria, and must endorse prescriptions "for the treatment of malaria only".	Prescriptions to indicate number of times to be dispensed (not exceeding four). Not more than fourteen days' supply to be prescribed for dispensing at one time.
Gauze—Surgical.	Control of Medical Equipment Order, Department of Defence.	May be used only for medical purposes.	Pharmacists should not supply for other than medical purposes.
Acacia Gum B.P. Acid Tannic. Aspirin. Ammonium Carbonate. Gum Benzoin. Sodium Citrate. Tragacanth. Urea.	Restricted by arrangement by the Medical Equipment Control Committee with wholesale druggists.	May be supplied for medical purposes only.	Pharmacists required to give undertaking when ordering from wholesaler that these drugs will be supplied only for medical purposes.
Acetone.	Department of Supply and Development.	May be supplied by pharmacists for medical purposes only, on an Order signed by a medical practitioner or matron in charge of a hospital.	Pharmacists required to give undertaking to wholesalers that supplies will be used only for medical purposes in accordance with the instruction.
Cocoanut Oil.	Order by Controller of Materials Supply.	To be supplied only on a prescription signed by a medical practitioner. Packing and sale for toilet purposes prohibited.	Treat as ordinary prescription. Cancellation not required.
Glycerin.	Order by Controller of Materials Supply.	Sale of glycerin in aqueous solution or pure prohibited except on the prescription of a medical practitioner. Use in all toilet preparations other than vanishing creams prohibited.	Compounds containing glycerin may be sold for medical purposes without prescription—*e.g.*, glycerin and tannin, glycerin and borax. *N.B.*—Permission to dispose of stocks of toilet preparations containing glycerin packed prior to the date of the Order was withdrawn as from April 30, 1942.
Liquid Paraffin.	Department of Supply and Development.	(a) Supply restricted to registered pharmaceutical chemists and retail traders whose place of business is four miles distant from the nearest pharmacy. (b) Sale by retail in container of capacity greater than eight fluid ounces prohibited. (c) Manufacture of paraffin emulsions containing more than 25% V/V liquid paraffin prohibited. (Doctors' prescriptions excepted.)	

Drug.	Commonwealth Department Controlling.	Nature of Commonwealth Restriction.	Remarks.
DEXTROSE.	Department of Supply and Development.	Sale or supply prohibited except for: (a) Government Medical Services nominated by the Secretary of the Department of Supply and Development. (b) Hospitals named by the Secretary. (c) Direct medical use approved by the Secretary and upon medical prescription. (d) Any other purpose as decided by the Secretary, Department of Supply and Development.	Treat as ordinary prescription. Cancellation after dispensing not required.
BROMIDES. IODIDES.	Controller of Materials Supply.	May be used only in the manufacture of compounds for medical treatment (*e.g.*, prescriptions, proprietaries).	Pharmacists and dispensaries required to give signed undertaking to wholesale suppliers when ordering these drugs that they will be used or supplied only for the purpose stipulated. Sale over the counter is prohibited, but the sale of medical preparations containing these drugs is permitted. Wholesale supply restricted to pharmacists and dispensaries.
CAMPHOR. BORACIC ACID. PERMANGANATES.	Ministry of Munitions, by Order of the Controller of Materials Supply.	May be used only in the manufacture of compounds for medical treatment. May be sold by retail only for medicinal purposes.	Wholesale supply restricted to pharmacists, dispensaries and stores more than four miles from nearest pharmacy, who give the required undertaking.
FORMALIN.	Ministry of Munitions, by Order of the Controller of Materials Supply.	May be sold for *bona fide* medical purposes only.	Application for release of formalin for fumigation or disinfection purposes should be accompanied by a certificate from a medical practitioner stating that the use of formalin is necessary.
TURPENTINE, VEGETABLE.	Controller of Materials, Ministry of Munitions.	To be used only in the manufacture of compounds for medical treatment (*i.e.*, prescriptions and other medicinal preparations). Sale otherwise is not permitted unless authorised in writing by Controller of Materials Supply.	Signed undertaking that conditions will be observed to be given to wholesaler.
METHYL SALICYLATE.			Signed undertaking that conditions will be observed to be given to wholesaler. (Use in fly sprays prohibited.)
PARAFFIN WAX.	Department of Supply and Development.	No person shall sell or agree to sell, supply, deliver, use, consume, process, produce or otherwise dispose of without written consent of Secretary, Department of Supply and Development.	

Issued by Direction of the Pharmacy Board of Victoria.

H. A. BRAITHWAITE, President.

N.B.—Penalty for any infringement of Orders of Regulations under *National Security Act*—Imprisonment not exceeding six months and fine of not more than £100.

THE CENTRAL MEDICAL COORDINATION COMMITTEE.

THE following statement has been received from Dr. J. H. L. Cumpston, Director-General of the Emergency Civil Medical Service.

At its last meeting, the Central Medical Coordination Committee considered in detail the situation in respect of civil medical services.

It was realized that, after the needs of the Fighting Services have been satisfied, only little more than half of the total number available medical practitioners is left for the civil community, and this means that all medical practitioners are working under considerable strain.

The Central Medical Coordination Committee placed on record its appreciation of the very fine work which had been done by the Executive Officers to the State Coordination Committees in each State and the very valuable service which had been rendered by the State Committees.

The way in which the medical profession generally had accepted this regimentation gave considerable satisfaction to the Central Committee, as it recognized that this ready acceptance by the profession of measures of control was probably one of the most valuable features of national organization under emergency conditions. A number of measures were decided upon in cooperation with the Directors of the Medical Services of the Fighting Forces to assist in meeting the pressure and in relieving to the fullest practicable extent the strain on the civil profession.

It was also decided that exhortations which were issued last year to the public should be renewed, and these, in abbreviated form, are as follow:

If you want to help your doctor in wartime, send messages before 10 a.m. if you want him to visit you. Remember that his petrol is rationed and that his travelling expenses have risen, so he doesn't want to cover the ground twice or more on one day, especially during the blackout.

Avoid night calls and Sunday visits whenever possible.

Come to the surgery if you can, rather than ask for a visit, and come during surgery hours, the earlier the better.

In a message state as clearly as you can what is wrong and how long the patient has been ill. Don't exaggerate or the doctor may have to neglect somebody more seriously ill in order to hurry to you.

The profession can do much to help itself by steadily educating the public along the above lines, and it is suggested that each medical practitioner do what he can in this direction.

Correspondence.

RECREATION IN WARTIME.

SIR: Your leading article on the necessity for some relaxation in the case of those who really work hard for war purposes brings to mind the action taken during the last war in Egypt. The chief difference is that it applied in Egypt mainly to convalescents and men on leave at the base after disagreeable and dangerous life in the desert and beyond.

At one time the feeling was that whilst men were fighting at the front with severe casualties it was out of place to indulge in amusements. In Cairo and elsewhere and under pressure, dances *et cetera* were cut out. After a short interval the command took the view that such men must do something and moderate provision of entertainment was arranged for.

Lady Allenby herself brought from Upper Egypt some of the breed of dancing horses and displayed their performances for the benefit of the men. Whilst the entertainments were kept within reasonable bounds they were continued and there was no desire to again put an end to them. To me it was a valuable object lesson. Of course, the circumstances are different, but the principle remains.

One of my jobs was to arrange for concerts *et cetera* in connexion with the Y.M.C.A. including some splendid lectures by experts. That on Ancient Egypt given by the head of the Department of Antiques was fascinating and thoroughly appreciated. It is just a case of hitting a happy and reasonable mean.

The Y.M.C.A. and the Lene Ashwell Concert companies traversed the whole field just behind the danger zone at the front.

The mechanism is set out in a work of mine entitled "The Y.M.C.A. in Egypt".

Yours, etc.,

James W. Barrett.

103-105, Collins Street,
Melbourne,
September 28, 1942.

VENEREAL DISEASE.

Sir: In view of the articles on venereal disease published in the journal of September 26, may I remind your readers that during the last war there were in British and Dominion troops 400,000 reported cases of venereal disease and in American troops 340,000, that is, 740,000 in all. These figures are official. Furthermore, that after the war Americans took one-day censuses of their cities and some Americans think venereal disease was not much if at all worse in the army than in civil life.

Yours, etc.,

James W. Barrett.

103-105, Collins Street,
Melbourne,
September 28, 1942.

THE BITE OF OXYURANUS SCUTELLATUS.

Sir: In his excellent summary "The Symptomatology and Treatment of the Bites of Australian Snakes", Dr. C. H. Kellaway writes in your issue of August 29, page 173, referring to the taipan, *Oxyuranus scutellatus*: "The symptoms resemble those of tiger snake bite, but the only descriptions available are by laymen, and stress the rapidly fatal result of the bite." Part of this statement is scarcely fair to the contributors to the Registry of Injuries Produced by Animals and Plants, namely Dr. Sharpe, Dr. Harper and Dr. Martell, whose experiences are recorded in the article "Snake Bite in Practice" published in your issue of July 6, 1940, pages 6 and 7.

A most interesting result in the patient who recovered is the almost complete loss of taste which has persisted.

Yours, etc.,

H. Flecker.

52, Abbott Street,
Cairns,
North Queensland.
September 29, 1942.

FOCAL INFECTION.

Sir: Dr. Frank Trinca's letter in the September 19 issue of your journal gives welcome support to the "focal infection" view of disease and is one of the few which have appeared substantiating these contentions. As far back as November 21, 1916, appeared my first article in this journal on "The Systemic Results of Infection of the Mouth, Nose and Accessory Sinuses". This was followed by "Chronic Disease and its Association with Focal Sepsis" in March 13, 1920, "Focal Infection and its Limitations" in May 7, 1921, and "The Streptococcus: The Biggest Menace of Mankind" in November 4, 1922. All which Dr. Trinca says in his letter can be found in these papers written over twenty years ago, but since that time little has appeared in support of these views, but several sarcastic letters which for the sake of those who wrote them I will refrain from quoting.

Dr. Trinca emphasizes the fact that he does not wish to associate himself with the views of extremists who go so far as to suggest that uterine myomata might be due to such a cause. As the result of focal infections is mainly dependent upon the action of bacterial toxins on cell life and the inflammatory reaction set up by the organisms themselves, it would be difficult to draw the line as to what class of cell damage and irritation was due to these toxins and what to some other cause or toxin. A cell having the properties of reproducing itself will do so when the necessary irritant is applied. The pathological findings of kidney damage due to chronic lead poisoning are in every way similar to those caused by bacterial toxins, as it is of little account to the individual cell what type of toxin is the harmful agent. We know that warts are due to the presence of a virus or even the gonococcus, and if the gonococcus can cause hypertrophic overgrowth on the penis, it is not stretching the imagination too far to believe that the lodgement of small colonies of cocci in the uterine muscle, which has such high powers of hypertrophy, can bring about the presence of myomata. The presence of a local irritant is all that is necessary. We have concrete examples where such substances as soot, tar and certain dyes set up overgrowth of tissues as well as the presence of virus infection as in chicken sarcoma, so the actual make-up of the irritant matters little as long as it is an irritant. The tubercle bacillus often shows similar properties as seen in lupus and massive glandular enlargement.

For many years I was a great proponent of the use of vaccines, but for long have found them unnecessary, as once the focus is removed all further invasion of tissues ceases, so there is little to be gained in trying to build up a resistance against an organism which no longer exists. I have never seen the return of any pathological conditions, which were due to a focus, after that focus had once been properly removed, even to goitres. If by chance one is unable to cure or remove a focus, then a vaccine may be of use. As about three-quarters of the diseases we are called upon to treat are dependent upon these factors, it would be of considerable importance if more men would report the results of their experiences on these lines, for we have by no means reached the limits which the harmful effects of bacterial toxins have upon cell life. By doing so we shall not only convince the sceptics but advance our own knowledge.

Yours, etc.,

Sydney Pern.

Ballarat,
Victoria,
September 29, 1942.

DISEASES OF THE EYE.

Sir: In the journal of September 19 your reviewer, with kindly elegance, relegated Sir John Parsons with his "Diseases of the Eye" to the Middle Ages. Apparently the book is not without merit, although half the review is devoted to carping criticism of minor details.

I must admit that I am one of "the faithful old worshippers at the shrine of Parsons" and I sincerely hope that the sound school of ophthalmology to which he belongs will never become extinct. His work is not that of a flashy commentator; rather is it based on an unequalled knowledge of the anatomy, physiology and pathology of the eye, topped off by a wide clinical experience. With sound judgement he gives a little space in a practical handbook to the rare operation of keratoplasty and to the slit lamp. His treatment of corneal ulcerations is very rational—the "additional drops of the silver or mercurial preparations being rather in the mediæval tradition" (whatever that may mean!).

To the modern ophthalmologist who commences his studies of the eye with an electric ophthalmoscope and a slit lamp, Parsons is obviously out of date. His equipment is a reflecting ophthalmoscope with four mirrors, a condensing lens and a monocular loupe. To this the slit lamp can add little. It is a valuable asset to confirm a doubtful point, but to say it is the trowel of the modern ophthalmologist is absurd. The truly modern ophthalmologist is the well-trained one—one whose clinical judgement is guided along sound lines by the use of simple methods with simple instruments. He is then the master of the ophthalmoscope, the slit lamp and the synoptophore—not their slave.

May I conclude with a little incident which will always remain fresh in my memory. One morning at Moorfields Sir John was demonstrating a rather unusual case—a cyst in

the vitreous readily visible at reading distance with the large plane mirror. The news soon spread to the other desks and a small crowd assembled to view the rarity. It seems hardly fair comment to add that it was missed entirely by a "modern" world-famous ophthalmologist with an electric ophthalmoscope!

Yours, etc.,

33, Collins Street, Melbourne, C.1, September 30, 1942. KEVIN O'DAY.

THE REPAIR OF DAMAGED HYPODERMIC SYRINGES.

SIR: Now that "Record" syringes are difficult to obtain, a reliable method of repairing damaged syringes should be as useful to others as it has been to myself. This refers to syringes damaged by cracking of the glass barrel for a varying distance from the nozzle upwards. I have repaired several of these and they will stand extreme pressure without admitting air or leaking.

The method: Take about two feet or ample length of silkworm gut (preferably twist as sold on reels). Soak in hot water for five minutes. Splice it on from the nozzle end upwards, commencing as a sailor splices a rope, but finishing with a loop to avoid levering up the turns—a few turns over the loop and pull end through with artery forceps. I believe the gut shrinks on slightly.

Naturally one would not use a cracked syringe for work like intravenous injection *et cetera*, as the cracks might retain traces of former contents, but these repaired syringes are still useful for many purposes, especially as the same syringe is usually kept for the one kind of solution. Even if city doctors might be fussy about using these repaired syringes, I feel sure country doctors would find them invaluable at times.

By the way, old syringes with jammed plungers, gummed up with blood *et cetera*, can easily be freed by soaking in "Solyptol" and similar oils.

Yours, etc.,

160, Pacific Highway, North Sydney, October 8, 1942. E. H. STAPLES.

RADIOLOGICAL EXAMINATION OF THE CHEST IN EXAMINATIONS FOR LIFE ASSURANCE.

SIR: At the risk of intruding on something that has already been fully considered, I ask: Why is a chest X ray not awarded a place with certain other investigations in the examination for life insurance? Surely the companies are running a risk by not making this an essential of every detailed examination for life insurance. We insist in these modern times on an X-ray examination of every member of the Australian Imperial Force. Is an examination of any individual in the light of modern knowledge and experience complete without this little detail, I ask.

Yours, etc.,

176, Macquarie Street, Hobart, Ocober 15, 1942. T. H. GODDARD.

POST-OPERATIVE TREATMENT OF MASTOID OPERATIONS.

SIR: It would appear from Dr. Blashki's correspondence that the epi-tympano operation is the only operation to be done in case of chronic middle ear suppuration; and that there is no place for the classical radical operation.

We should keep an open mind, and I agree that the epi-tympano operation is an excellent one in selected cases, but is not always successful.

Only last week I had to convert an epi-tympano operation that had been done in Sydney to a classical radical.

It is unfortunate that the other fellow sees our failures and this is apt to obscure our judgement.

Yours etc.,

60, Anson Street, Orange, October 16, 1942. R. E. BUCKINGHAM.

[This correspondence is now closed.—EDITOR.]

Obituary.

CONSTANCE ELLIS.

We are indebted to Dr. Janet L. Greig for the following appreciation of the late Dr. Constance Ellis.

The death of Dr. Constance Ellis removes one of the most outstanding personalities among the medical women in Melbourne.

Educated at the Presbyterian Ladies' College, she early showed exceptional mental qualities which eventually led her to the University, where she became a student at Trinity College. She took up medicine, graduating with honours, and among her later medical distinctions she obtained the degree of M.D., being the first woman in Melbourne to do so. Her position on the honours list in her final examinations entitled her to a residentship at the Melbourne Hospital, and following her year of duty there, she went on to the Children's Hospital, serving two years. At the end of her

term, she commenced private practice in Malvern, and building up a large connexion, she eventually became known as an eminent specialist for women and children. During the early years of her practice, she was appointed demonstrator and lecturer in pathology at the university to the late Sir Harry Allen, and was in charge of this department during his absence.

From her earliest years of medical practice, Dr. Ellis was closely associated with the Queen Victoria Hospital, both as physician and pathologist, and the hospital remained one of the keenest interests of her life. Only second to this, was her interest in baby health centres, with which she was identified from their inception, and to which her service was untiring. She held office as President of the Medical Women's Society, and acted for some years as their delegate on the Council of the Victorian Branch of the British Medical Association.

She was a foundation member of the University Women's College, and a generous donor in its establishment. She was closely associated with the early years of the Emily MacPherson College of Domestic Economy and the National Council of Women, and she was a foundation member and later President of the Lyceum Club.

In all activities concerning education, and a wider scope for the talents and capacities of women, Dr. Ellis was one of the first to come forward with support.

Her own personal interests were wide and human. She never closed her mind to, or withheld her sympathy from, anything that led to progress. Her collection of books and pictures, many of which she has bequeathed to the University Women's College, in themselves testify to the qualities of her mind. Her capacity for making friends was enormous, and it has been well said that "the law of kindness was her rule of life". Together with this, and of the same texture, was her joy in life, and all life had to offer—friends, nature

in any aspect, art, books, travel, children—all drew a quick response, and the laugh that came so easily.

For her high ideals of citizenship and her place among the women of her time, she will be remembered. Her friends mourn her. But her life was a full and happy one, and she lived it out. She might have said with Landor:

"I warmed both hands before the Fire of life,
It sinks—and I am ready to depart."

GEORGE ALBERT WALPOLE.

We regret to announce the death of Dr. George Albert Walpole which occurred on October 16, 1942, at Devonport, Tasmania.

Naval, Military and Air Force.

APPOINTMENTS.

The following appointments have been promulgated in the *Commonwealth of Australia Gazette*, Number 269, of October 8, 1942.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

Appointment.—Surgeon Lieutenant (for Short Service) Frank Frederick Coffey is appointed Surgeon Lieutenant on the Permanent List, dated 12th July, 1942.

Promotion.—Surgeon Lieutenant Frank Frederick Coffey is promoted to the rank of Surgeon Lieutenant-Commander, dated 12th July, 1942.

CASUALTIES.

According to the casualty list received on October 19, 1942, Major Hugh Rayson, M.C., A.A.M.C., is reported missing.

Nominations and Elections.

The undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Blacker, Janie Una, M.B., B.S., 1949 (Univ. Sydney), 127, Milton Street, Ashfield.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association:

Bailey, Alan William Hale, M.B., B.S., 1941 (Univ. Sydney), 21, Canberra Avenue, North Wollstonecraft.

Blomfield, Edwin Cordeaux, M.B., B.S., 1942 (Univ. Sydney), Hornsby and District Hospital, Hornsby.

Boorman, John Luke, M.B., B.S., 1937 (Univ. Sydney), Main Street, Cessnock.

Byers, Kevin John, M.B., 1941 (Univ. Sydney), Lewisham Hospital, Lewisham.

Curtin, Bryan Austin David, M.B., B.S., 1942 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.

Dynon, Geoffrey Patrick, M.B., B.S., 1941 (Univ. Sydney), NX77349 Captain G. P. Dynon, 2/1 Aust. Pioneer Battalion, A.I.F., Australia.

Leggo, Hedley Oliver Orion, M.B., B.S., 1942 (Univ. Sydney), 174, Saint John's Road, Forest Lodge.

McDonogh, William Patrick, M.B., B.S., 1942 (Univ. Sydney), 144, Banksia Street, Botany.

Rowlands, Thomas Neville, M.B., B.S., 1940 (Univ. Sydney), Holbrook.

Clifton-Smith, Geoffrey, M.B., B.S., 1942 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.

Stout, Alta Frances, M.B., Ch.B., 1935 (Univ. Edinburgh), c.o. Dr. Uren, High Street, Penrith.

Stout, Edward William, M.B., Ch.B., 1935 (Univ. Edinburgh), c.o. Dr. Uren, High Street, Penrith.

Thomas, David Lloyd, M.B., B.S., 1942 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Thomson, Mary Macdonald, M.B., B.S., 1940 (Univ. Sydney), Yirri Yirri, 4, Hale Road, Mosman.

Books Received.

"Tuberculosis in Childhood", by Dorothy Stopford Price, M.D. (Dublin), with a chapter on tuberculous orthopædic lesions and other contributions by Henry F. MacAuley, M.Ch., F.R.C.S.I.; 1942. Bristol: John Wright and Sons Limited. London: Simpkin Marshall Limited. 7¼" × 4¾", pp. 222 with 87 illustrations. Price: 17s. 6d. net.

Diary for the Month.

Oct. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Oct. 29.—New South Wales Branch, B.M.A.: Branch.
Oct. 29.—South Australian Branch, B.M.A.: Branch.
Oct. 30.—Tasmanian Branch, B.M.A.: Council.
Nov. 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Nov. 4.—Western Australian Branch, B.M.A.: Council.
Nov. 5.—South Australian Branch, B.M.A.: Council.
Nov. 6.—Queensland Branch, B.M.A.: Branch.
Nov. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Nov. 10.—Tasmanian Branch, B.M.A.: Branch.
Nov. 13.—Queensland Branch, B.M.A.: Council.
Nov. 17.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 18.—Western Australian Branch, B.M.A.: Branch.
Nov. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

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